BLM LIBRARY
88045460

Draft Environmental Impact Statement

TRANSCOLORADO GAS TRANSMISSION PROJECT

Colorado/NewMexico

U.S. Department of the Interior
Bureau of Land Management
Montrose District Office, Montrose Colorado

August 1991

RECEIVED
BUREAU OF LAND MGMT.

91 AUG 22 PM 1:08

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

ID88045460

C-51280
(CO-033)
TD
195
.R5
T736
1991

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
MONTROSE DISTRICT OFFICE
2465 SOUTH TOWNSEND
MONTROSE, COLORADO 81401

IN REPLY REFER TO:

Dear Reader:

Enclosed for your review and comment is the Draft Environmental Impact Statement (DEIS) for the TransColorado Gas Transmission Project (TransColorado).

The DEIS presents and analyzes the environmental impacts for the TransColorado project. It also analyzes the impacts of the various alternatives and issues raised in the scoping process conducted during the summer of 1990.

You are invited to make written or oral comments on this document. Public hearings to receive oral comments on the DEIS are scheduled as follows:

Date and Time	City	Location
Sept. 24, 1991 7:30 p.m.	Grand Junction, Colorado	BLM Conference Room 764 Horizon Drive
Sept. 25, 1991 7:30 p.m.	Montrose, Colorado	BLM Conference Room 2465 South Townsend
Sept. 26, 1991 7:30 p.m.	Cortez, Colorado	Anasazi Motor Inn Convention Center 666 South Broadway

An informal open house session will be held prior to each hearing to provide an opportunity to meet with BLM representatives to discuss and ask questions about the DEIS. The open house sessions will run from 6:30 p.m. to 7:30 p.m.

In order to be considered in the Final EIS, your written comments must be received by close of business (4:30 p.m.) on October 8, 1991. Your name and complete mailing address should be on all written comments, including copies that you may make available to us at the public hearings.

Please address your written comments or questions to Chuck Finch, Project Manager, Bureau of Land Management, 2465 South Townsend Avenue, Montrose, Colorado 81401, (303) 249-7791.

Sincerely,

Alan L. Kesterke

Alan L. Kesterke
District Manager

Enclosure

BLM LIBRARY
RS 150A BLDG 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

TRANSCOLORADO GAS TRANSMISSION PROJECT

ENVIRONMENTAL IMPACT STATEMENT

Draft (X) Final ( )

Lead Agency: Department of the Interior
Bureau of Land Management

Cooperating Agency: Department of Agriculture
Forest Service

1. Type of Action: Administrative (X) Legislative ( )

2. ABSTRACT: This draft Environmental Impact Statement (Draft EIS) analyzes three alternatives for the TransColorado Gas Transmission Project (TransColorado): 1) the Proposed Action, (2) the Agency Preferred Alternative, and (3) the No Action Alternative.

The Proposed Action is to construct, operate, and maintain a natural gas pipeline and associated facilities for the purpose of transporting natural gas produced in the Rocky Mountain Region to a pipeline terminus at the Blanco gas treatment plant near Bloomfield, New Mexico. The Proposed Action consists of a 22- and 24-inch diameter pipeline, 6 new compressor stations, 1 upgraded compressor station, and 6 meter stations. The pipeline route proposed by TransColorado is 302 miles long.

The Agency Preferred Alternative is also to construct, operate, and maintain a natural gas pipeline to transport Rocky Mountain Region natural gas to the Blanco gas treatment plant near Bloomfield, New Mexico. The Agency Preferred Alternative also consists of a 22- and 24-inch diameter pipeline, 6 new compressor stations, 1 upgraded compressor station, and 6 meter stations. The primary difference between the Proposed Action and Agency Preferred Alternative is the pipeline route, which differs in the Norwood and in the Mancos areas in western Colorado. The agency preferred pipeline route is 290 miles long.

The No Action Alternative assumes the project would not be constructed.

3. For further information: Chuck Finch, Project Manager
Bureau of Land Management
2465 South Townsend Avenue
Montrose, CO 81401
Telephone: (303) 249-7791

Date Draft EIS made available to EPA and to the public: August 23, 1991

Draft EIS Comments Due: October 8, 1991

SUMMARY

This draft environmental impact statement (draft EIS) analyzes the impacts of constructing and operating a new natural gas pipeline system in western Colorado and northwestern New Mexico. The pipeline would deliver natural gas produced in the Rocky Mountain Region to a pipeline terminus at the Blanco gas treatment plant near Bloomfield, New Mexico. The natural gas transported by the new natural gas pipeline would be commingled with gas from other sources at the Blanco plant and then distributed to Southern California and Midwest markets via the El Paso or Transwestern pipelines.

The pipeline is being proposed by the TransColorado Gas Transmission Company (TransColorado), which is a joint venture among Questar TransColorado, Inc., (subsidiary of Questar Pipeline Company), WestGas TransColorado, Inc. (subsidiary of Western Gas Supply Company), and KNEnergy TransColorado, Inc. (subsidiary of KNEnergy).

TransColorado has applied to the U.S. Department of the Interior (DOI), Bureau of Land Management (BLM) for right-of-way (ROW) grants and permits to cross Federal lands managed by the BLM and Forest Service (FS). The BLM has assumed the administrative lead and is responsible for preparation of this draft EIS. TransColorado also has applied to the Federal Energy Regulatory Commission (FERC) for a Certificate of Convenience and Necessity. This certificate is required before the applicant can construct the pipeline.

ALTERNATIVES CONSIDERED IN PREPARATION OF THIS DRAFT EIS

Several alternatives to building the TransColorado pipeline were considered in preparation of this draft EIS. The alternatives included a No Action Alternative, an Energy Conservation Alternative, Pipeline System Alternatives, and End Use Alternatives. After careful evaluation and analysis, only the Proposed Action, Agency Preferred Alternative, and No Action Alternative were analyzed in detail in this draft EIS. The primary difference between the Proposed Action and the Agency Preferred Alternative is the pipeline route. The pipeline route selected by the Federal agencies is different than that proposed by TransColorado in the Norwood area and in the Mancos Valley area (see maps in back of this document).

There are three locations where a section of either the proposed route or agency preferred route could be replaced by route variations. These route variations are described in Appendix B of this document. The large maps in the back of this draft EIS show the TransColorado proposed route, the agency preferred route, and the route variations.

Proposed Action

Project Description

Under the Proposed Action, the TransColorado natural gas pipeline system would be constructed, operated, and maintained as described in Chapter 2. The TransColorado proposed pipeline route would be 302 miles long. The outside diameter of the pipeline would be 22 to 24 inches. It would transport 300 million cubic feet of gas per day.

The pipeline would be constructed within a 75-foot-wide construction ROW, but the permanent ROW would be 50 feet in width. For purposes of analysis, it was assumed the entire acreage within the ROW would be disturbed. Six new compressor stations would be constructed: Questar-Piceance Creek (MP 0), WestGas-Meeker (MP 2.7), WestGas-DeBeque (MP 48.5), TransColorado-Olathe (MP 121.6), Rocky Mountain-Big Gypsum (MP 165.7), and either TransColorado-Dolores Alternate 1 (MP 207.7), or TransColorado-Dolores Alternate 2 (MP 219.6). One existing compressor station near DeBeque would be expanded. Each compressor station would require disturbance of approximately 5 acres. Six meter stations which measure the amount of gas going through the pipeline, would also be constructed. Each meter station would require disturbance of approximately 0.25 acre.

The total disturbance for pipeline construction would be 2,802 acres. This includes the clearing of the construction ROW, compressor stations, meter stations, and other related facilities for the proposed pipeline.

Block valves, pigging facilities, (cleaning devices) corrosion protection facilities (cathodic stations), and communication facilities would be included in the project. These facilities would be located within the permanent ROW or with compressor station and meter station sites.

Pipeline construction would take approximately 9 months beginning in April 1992 and ending in December 1992. The pipeline would be constructed by three crews (spreads) working in three separate locations along the pipeline, simultaneously. The three mainline construction spreads would employ an average of 480 workers each with a maximum of 550 persons during peak construction (a 10-week period). In total, approximately 1,440 workers would be employed at any one time during the construction phase. After construction is completed, approximately 20 workers would be employed for the operation of the pipeline and ancillary facilities.

Environmental protection measures developed from scoping meetings, general agency requirements, and standard industry practice would be applied to both private and Federal lands unless otherwise noted. An independent, private environmental inspector would be hired for each spread to monitor construction and ensure compliance with approved construction and environmental protection measures on private and state lands. A Federal authorized officer would be responsible for monitoring and compliance on Federal lands.

Impacts

Most impacts would be short-term. Impacts include, but are not limited to, the following:

- Air Quality. Fuel combustion by pipeline construction equipment would increases the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short-term along 1.4 pipeline miles per day for an estimated 216 days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites. The daily fuel combustion emissions per mile from these activities are estimated to be equivalent to those emitted from a typical major urban street. Operation of seven compressor stations would increase the local (within 1 mile) concentrations of nitrogen dioxide and carbon monoxide. These increases would range from 2.3 times the annual average background levels for carbon monoxide to 11 times the annual average background levels for nitrogen dioxide. No pollutant concentration would exceed 50 percent of the applicable national air quality standard. Based on first-order, conservative screening analyses, the Piceance Creek and Rocky Mountain DeBeque compressor stations show a potential exceedance of the Prevention of Significant Deterioration (PSD) Class II nitrogen dioxide increment. Additional detailed, and more realistic modeling should show lower potential impacts. Also, permit application review by the State of Colorado may require specific emission control equipment or other operation procedures. For example, new reciprocating compressor stations are available with approximately 1/3 lower NO_x emissions, turbine compressor stations would emit about 1/2 less NO_x emissions, and selective catalytic controls (although untested) may provide 90 percent control. Regardless, all operations must comply with applicable local, state, and Federal air quality regulations. A plume visibility screening analysis indicates that operation of the Dolores Alternate 2 compressor station could cause plume visibility impacts at Mesa Verde National Park. If it is found that after application of technically achievable mitigation measures that the Dolores Alternate 2 compressor station would not meet National Park Service and State of Colorado visibility requirements, this site would not be approved by the Department of Interior for construction. The Dolores Alternate 1 site would still be available for approval.

- Water Quality. Trenching, pipe laying, and backfilling in 5 rivers (Colorado, Gunnison, San Miguel, Dolores, and Animas) and 5 major streams (Piceance Creek, Roan Creek, Plateau Creek, West Mancos River, and Middle Mancos River), and 17 minor streams would increase suspended sediment for 1 to 5 days during the pipeline installation period.

- Municipal Water Supplies. Clearing, grading, trenching, and backfilling 36 acres of ROW

within the Palisade municipal watershed would slightly increase soil erosion, and slightly decrease the permeability of the ROW soils over the short-term (1 to 3 years). The pipeline would avoid all spring clusters and intakes. Trenching across the Dolores River would slightly increase suspended sediment at the Dolores municipal water treatment plant intake for a period of 2 to 5 days.

- Soils. Construction would increase soil erosion for the short-term, generally stabilizing to pre-construction levels within 1 to 5 years. Some increased erosion would be expected on the entire 2,802 acres. On areas of saline/alkaline soils (527 acres), steep (greater than 15 percent) slopes (336 acres), or shallow/rocky soils (1,090 acres), revegetation may be more difficult. Over the long-term, wind and water erosion losses and vegetation productivity losses from the pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.

- Forestry. Pipeline construction would remove conifer and aspen timber resources and pinyon-juniper fuelwood/fencepost resources from 900 acres. These would be long-term impacts of approximately 11 percent of the timber, fuelwood, and fencepost annual harvest from adjacent public lands.

- Cultural Resources. Construction would require mitigation of NRHP-eligible (National Register of Historic Places) archaeological sites that could not be avoided during pipeline construction. The required Class III surveys and TransColorado's Programmatic Agreement would mitigate impacts to cultural resources and provide for data recovery where sites must be disturbed. Any disturbance to traditional cultural properties of Native Americans or indirect impacts due to unauthorized collection of surface artifacts could decrease the value or significance of the sites.

- Visual Resources. Approximately 4.3 miles of short- and long-term visual resource quality decreases will occur along the ROW and at four aboveground facility sites. These impacts would exceed the visual management objectives for these areas.

- Socioeconomics. Occupants of 42 residences would be exposed to short-term increases in noise and fugitive dust for 2 to 3 weeks during construction. Crop production would be precluded on 273 acres for an estimated 2 years. Construction activities would result in employment of approximately 360 local workers and local expenditures of $5.8 million by local and non-local workers. Rental housing, motel/hotel, and RV accommodations for the construction labor force might not be adequate during the summer in the Durango area.

  Operation of the pipeline would yield approximately $4.2 million in first year property taxes, and $10,000 in ROW fees would be paid to Federal agencies during the first year. Based on current valuations, the annualized value of timber, fuelwood, and livestock forage removed from the ROW would represent approximately 11 percent of the annual Federal ROW fees. The value of crop production precluded on 273 acres for 2 years is estimated to be $44,800. Approximately 20 persons would be employed as operational staff. Payroll for this staff would result in local expenditures of approximately $219,000 annually for goods and services. Operation of the pipeline would increase the private land area committed to long-term utility uses by 787 acres. The combination of the TransColorado ROW with existing parallel ROWs would preclude installation of buildings on an average of 12 percent of the area of 15 small private land parcels (less than 20 acres) out of the 227 private parcels that would be crossed.

  The Southern Utes would likely experience increased competition for sales of tribal natural gas. However, the extent to which this increased competition would affect sales is difficult to quantify because of uncertainties in estimating available gas supplies, future market prices, and future changes in pipeline capacity.

Agency Preferred Alternative

Project Description

Under the Agency Preferred Alternative, the TransColorado natural gas pipeline system would be constructed, operated, and maintained as described under the Proposed Action except for two routing changes. The first routing change would occur in the Norwood area, and the second routing change would occur in the Mancos Valley area.

The agency preferred pipeline route would be 290 miles long. As under the Proposed Action, the outside diameter of the pipeline would be 22 to 24 inches. It would transport 300 million cubic feet of gas per day.

The pipeline ROW would be the same as that described under the Proposed Action except where the routes differ in the Norwood area and in the Mancos Valley area. As under the Proposed Action, six new compressor stations would be constructed: Questar-Piceance Creek (MP 0), WestGas-Meeker (MP 2.7), WestGas-DeBeque (MP 48.5), TransColorado-Olathe (MP 121.6), Rocky Mountain-Maverick (MP 151.7) (would replace the Proposed Action Rocky Mountain-Big Gypsum [MP 165.7]) and one of three possible compressor sites (Dolores [MP 215.2], Dolores Alternative 1 [MP 198.0], or Dolores Alternative 2 [MP 209.8]). One existing compressor station would be expanded. Each compressor station would require disturbance of approximately 5 acres. Six meter stations would also be constructed. Each meter station would require disturbance of approximately 0.25 acre.

The total disturbance for pipeline construction would be 2,693 acres. This includes the clearing of the construction ROW, compressor stations, meter stations, and other related facilities for the proposed pipeline. The remaining ground disturbing activities and other project features would remain the same as those described under the Proposed Action.

Impacts

Most impacts would be short-term. Impacts include, but are not limited to, the following:

- Air Quality. Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 207 days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites. The daily fuel combustion emissions per mile from these activities are estimated to be equivalent to those emitted from a typical major urban street. Operation of seven compressor stations would increase the local (within 1 mile) concentrations of nitrogen dioxide and carbon monoxide. These increases would range from 2.3 times the annual average background levels for carbon monoxide to 11 times the annual average background levels for nitrogen dioxide. No pollutant concentration would exceed 50 percent of the applicable national air quality standard. Based on first-order, conservative screening analyses, the Piceance Creek and Rocky Mountain DeBeque compressor stations show a potential exceedance of the Prevention of Significant Deterioration (PSD) Class II nitrogen dioxide increment. Additional detailed, and more realistic modeling should show lower potential impacts. Also, permit application review by the State of Colorado may require specific emission control equipment or other operation procedures. For example, new reciprocating compressor stations are available with approximately 1/3 lower NO_x emissions, turbine compressor stations would emit about 1/2 less NO_x emissions, and selective catalytic controls (although untested) may provide 90 percent control. Regardless, all operations must comply with applicable local, state, and Federal air quality regulations. A plume visibility screening analysis indicates that operation of the Dolores and Dolores Alternate 2 compressor stations located along the preferred pipeline route could cause plume visibility impacts at Mesa Verde National Park. If it is found that after application of technically achievable mitigation measures that the Dolores, or the Dolores Alternate 2 compressor station would not meet National Park Service and State of Colorado visibility requirements, these sites

would not be approved by the Department of Interior for construction.

- Water Quality. Trenching, pipe laying, and backfilling 5 rivers (Colorado, Gunnison, San Miguel, Dolores, and Animas), and in 4 major streams (Piceance Creek, Roan Creek, Plateau Creek, and West Mancos River), and 17 minor perennial streams would increase suspended sediment for 1 to 5 days during the pipeline installation period.

- Municipal Water Supplies. Clearing, grading, trenching, and backfilling 36 acres of ROW within the Palisade municipal watershed would slightly increase soil erosion, and slightly decrease the permeability of the ROW soils over the short-term (1 to 3 years). The pipeline would avoid all spring clusters and intakes. Trenching across the Dolores River would slightly increase suspended sediment at the Dolores municipal water treatment plant intake for a period of 2 to 5 days.

- Soils. Construction would increase soil erosion for the short-term, generally stabilizing to pre-construction levels within 1 to 5 years. Some increased erosion would be expected on the entire 2,693 acres. On areas of saline/alkaline soils (382 acres), steep (greater than 15 percent) slopes (282 acres), or shallow/rocky soils (1,200 acres), revegetation may be more difficult. Over the long-term, wind and water erosion losses are not expected to exceed those presently occurring on adjacent, undisturbed soils.

- Forestry. Pipeline construction would remove conifer and aspen timber resources and pinyon-juniper fuelwood/fencepost resources from 812 acres. These would be long-term impacts of approximately 10 percent of the annual timber, firewood, and fencepost harvest from adjacent public lands.

- Cultural Resources. Construction would increase data recovery of archaeological sites for the National Register of Historic Places (NRHP) that could not be avoided during pipeline construction. The required Class III surveys and TransColorado's Programmatic Site Agreement would protect cultural resources and provide for data recovery where sites must be disturbed. Any disturbance to traditional cultural properties of Native Americans or indirect impacts due to unauthorized collection of surface artifacts could decrease the value or significance of the sites.

- Visual Resources. Approximately 10.4 miles of short- and long-term visual resource quality decreases would occur along the ROW and at four aboveground facility sites. These impacts would exceed the visual management objectives for these areas.

- Socioeconomics. Construction of the pipeline would conflict with the Montezuma County resolution closing the existing Mancos Valley utility corridor to additional pipeline and transmission facilities. Occupants of 66 residences would be exposed to short-term increase in noise and fugitive dust for 2 to 3 weeks. Crop production would be precluded on 318 acres for an estimated 2 years. Construction activities would result in employment of approximately 360 local workers and local expenditures of $5.8 million by local and non-local workers. Rental housing, motel/hotel, and RV accommodations for the construction labor force might not be adequate during the summer in the Durango area.

  Operation of the pipeline would yield approximately $4.0 million in first year property taxes, and $10,000 in ROW fees would be paid to Federal agencies for the first year. Based on current valuations, the annualized value of timber, fuelwood, and livestock forage removed from the ROW would represent approximately 10 percent of the annual Federal ROW fees. The value of crop production precluded on 318 acres for 2 years is estimated to be $52,200. Approximately 20 persons would be employed as operational staff. Payroll for this staff would result in local expenditures of approximately $219,000 annually for goods and services. Operation of the pipeline would increase the private land area committed to long-term utility uses by 949 acres. The combination of the TransColorado ROW with existing parallel ROWs would preclude installation of buildings on an average of 16 percent of the area of 21 small land

parcels (less than 20 acres) out of the 265 private parcels crossed by the agency preferred route.

The Southern Utes would likely experience increased competition for sales of tribal natural gas. However, the extent to which this increased competition would affect sales is difficult to quantify because of uncertainties in estimating available gas supplies, future market prices, and future changes in pipeline capacity.

No Action Alternative

Under the No Action Alternative, the TransColorado natural gas pipeline system would not be constructed. However, for the purpose of analysis, it was assumed that a pipeline system similar to that proposed by TransColorado would be constructed to transport gas from the Rocky Mountain region to the same end use markets in Southern California and the Midwest. It was also assumed that the pipeline would interconnect with the same or similar major interstate pipeline systems as those proposed by TransColorado. These assumptions are based on the Federal energy program incentives to produce natural gas, availability of natural gas in the Rocky Mountain region, and demands for natural gas in Southern California and the Midwest (see Chapter 1, Natural Gas Supply and Demand section).

Impacts

If the TransColorado natural gas pipeline system were not constructed, gas suppliers in the Piceance Basin would not be able to interconnect to a gas transmission line to transport natural gas to market. The surface disturbance associated with the project would not occur. It is expected that development of coal bed methane would continue in the Piceance Basin, but at a potentially lower drilling rate. The Southern Utes may continue to lose an undetermined amount of royalty revenues due to their perception of a currently existing shortfall in pipeline capacity out of the San Juan Basin.

UNRESOLVED ISSUES

- Visual Impacts on the Grand Mesa. In the Grand Junction and Palisade areas, residents are concerned about the visual effects of the pipeline on the western flank of the Grand Mesa and about impacts on municipal water supplies in the Palisade municipal watershed.

- Location of Pipeline in the Mancos Valley. In the Mancos Valley, the Proposed Action is to construct the pipeline outside an existing corridor on the San Juan National Forest. If this route were used, a new corridor would have to be designated on the San Juan National Forest to allow for the pipeline. The Agency Preferred Alternative is to construct the pipeline within an existing corridor, which is mostly on private land. The Federal agencies are concerned about the natural resource environmental impacts of creating a new corridor on Forest Service land under the Proposed Action, and the private citizens are concerned about the social and economic effects of placing another pipeline on their private property under the Agency Preferred Alternative. In 1986, the Montezuma County Commissioners passed a resolution closing the existing utility corridor in the Mancos Valley to future pipelines. The pipeline route under the Agency Preferred Alternative is located in this corridor.

- Southern Ute Indians' Lost Opportunity to Sell Natural Gas. The Southern Ute Indians are concerned about a loss of opportunity to sell gas produced on their reservation. The Southern Utes believe that the natural gas supplies transported by the TransColorado pipeline would fill the existing El Paso pipeline to capacity and that there would be no space for Ute Indian gas in the El Paso pipeline.

- Southern Ute Indians' Loss of Gas Sales. The Southern Ute Indians are also concerned about the loss of sales that could result from increased competition among natural gas producers. The extent to which the competition would increase and to which the increased competition would affect the sale of gas produced by the Southern Utes is uncertain at this time.

- Air Quality Impairment in Mesa Verde National Park. The National Park Service has raised a concern regarding impairment of air quality in the Mesa Verde National Park. Mesa Verde National Park is a mandatory Prevention of Significant Deterioration (PSD) Class I area under provisions of the Clean Air Act. By regulation, BLM may not authorize a project that would violate local, state, or Federal air quality regulations. Potential air pollution emissions from the proposed project would have cumulative effects in the Four Corners region when combined with a number of existing sources (e.g., coal-fire power plants, refineries, agricultural burning, etc.). These include the existing and foreseeable projects listed in Table 1-2 located in Montezuma and La Plata Counties Colorado, and San Juan County, New Mexico. Of primary concern are small, localized sources of oxides of nitrogen (NO_x), which may cause cumulative haze visibility and atmospheric deposition effects throughout the region. The State of Colorado (Air Pollution Control Division), USDI-National Park Service, USDA-Forest Service, and the Bureau of Land Management have met to cooperatively address this issue. However, potential cumulative air quality impacts are unknown at this time.

SUMMARY

TABLE OF CONTENTS

SUMMARY i
CHAPTER 1: INTRODUCTION 1
INTRODUCTION 1
PURPOSE OF AND NEED FOR THE PROJECT 1
NATURAL GAS SUPPLY AND DEMAND 3
Natural Gas Uses and Demands in the Midwest and California 3
Natural Gas Supply in Western Colorado 3
TRANSCOLORADO PARTNER SYSTEMS 3
Western Gas Supply 4
KNEnergy 4
Questar Pipeline Company 4
RELATIONSHIP OF TRANSCOLORADO TO OTHER EXISTING, APPROVED, OR PROPOSED NATURAL GAS PIPELINE SYSTEMS 8
Existing Pipelines 8
Natural Gas Pipelines under Construction 8
Proposed Natural Gas Pipelines 8
RELATED PROJECTS 11
FEDERAL APPROVAL PROCESS AND AUTHORIZING ACTIONS 11
RELATIONSHIP TO BLM AND FOREST SERVICE POLICIES, PLANS, AND PROGRAMS 11
Bureau of Land Management 17
U.S. Forest Service 18
RELATIONSHIP TO INDIAN TRIBAL POLICIES AND PLANS 18
Trust Roles and Responsibilities 19
RELATIONSHIP TO NON-FEDERAL POLICIES, PLANS, AND PROGRAMS 19
SCOPING 19
Scoping Meetings 19
Issues 24
ROUTE SELECTION PROCESS 26
CHAPTER 2: ALTERNATIVES INCLUDING THE PROPOSED ACTION 29
INTRODUCTION 29
Proposed Action 29
Construction 29
Operation and Maintenance 46
Abandonment 47
Emergency Response 47
Environmental Protection Measures 47
AGENCY PREFERRED ALTERNATIVE 69
Construction 69
Facilities Construction 70
Environmental Protection Measures 80

CONTENTS

ROUTE DIFFERENCES - PROPOSED ACTION AND AGENCY PREFERRED ALTERNATIVE 80
Rationale for Selection of Agency Preferred Route in the Norwood Area 80
Rationale for Selection of Agency Preferred Route in the Mancos Valley 80
NO ACTION ALTERNATIVE 90
ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS 90
Energy Conservation 90
Pipeline System Alternatives 90
End Use Pipeline Alternatives 91
SUMMARY OF IMPACTS 91
CHAPTER 3: AFFECTED ENVIRONMENT 97
INTRODUCTION 97
CLIMATE 97
AIR QUALITY 97
TOPOGRAPHY 99
LEASABLE MINERALS 102
Oil and Gas 102
Coal Bed Methane 103
Oil Shale 103
Coal 103
MINERAL MATERIALS 104
WATER QUALITY AND QUANTITY 104
Surface Water 104
Municipal Watersheds and Water Supplies 105
WETLANDS 107
SOILS 107
Salinity/Alkalinity 108
Steep Slopes 108
Rocky/Stony Shallow Soils 108
Wet Soils 109
Agricultural Soils 109
PRIME FARMLAND AND FARMLANDS OF STATEWIDE IMPORTANCE 109
VEGETATION 109
FORESTRY 111
LIVESTOCK GRAZING 111
WILDLIFE 114
Big Game 114
Small Game 114
Non-Game 115
FISHERIES 115
THREATENED AND ENDANGERED SPECIES 116
CULTURAL RESOURCES 117

VISUAL RESOURCES 119
NOISE 120
AREAS OF CRITICAL ENVIRONMENTAL CONCERN 122
TRANSPORTATION 122
SOLID AND HAZARDOUS WASTES 122
SOCIOECONOMIC CONDITIONS 125
Population 125
Employment 125
Fiscal Conditions 125
Public Services 127
Housing 127
Private Lands 130
ROUTE DIFFERENCES - PROPOSED ACTION AND AGENCY PREFERRED ALTERNATIVE 130
Norwood Area 130
Mancos Valley Area 131

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES 155
INTRODUCTION 155
Assumptions and Guidelines 155
Assumptions 155
Guidelines 155
PROPOSED ACTION 156
Impacts to Air Quality 156
Impacts to Topography 159
Impacts to Leasable Minerals 159
Impacts to Mineral Materials 160
Impacts to Surface Water Quality 160
Impacts to Municipal Watersheds and Water Supplies 161
Impacts to Bureau of Reclamation Water Projects 161
Impacts to Wetlands 161
Impacts to Soils 161
Impacts to Prime and Unique Farmlands 162
Impacts to Forestry 162
Impacts to Livestock Grazing 162
Impacts to Wildlife 162
Impacts to Fisheries 164
Impacts to Threatened and Endangered Species 164
Impacts to Cultural Resources 164
Impacts to Native American Religious Values 165
Impacts to Visual Resources 165
Impacts to Transportation System 166
Impacts to Solid Waste Facilities 166
Impacts to Socioeconomic Conditions 166
Impacts to Public Safety 170

CONTENTS

AGENCY PREFERRED ALTERNATIVE 171
Impacts to Air Quality 171
Impacts to Topography 173
Impacts to Leasable Minerals 173
Impacts to Mineral Materials 173
Impacts to Surface Water Quality 174
Impacts to Municipal Watersheds and Water Supplies 174
Impacts to Bureau of Reclamation Water Projects 174
Impacts to Wetlands 174
Impacts to Soils 174
Impacts to Prime and Unique Farmlands 174
Impacts to Forestry 175
Impacts to Livestock Grazing 175
Impacts to Wildlife 175
Impacts to Fisheries 175
Impacts to Threatened and Endangered Species 175
Impacts to Cultural Resources 176
Impacts to Native American Religious Values 176
Impacts to Visual Resources 176
Impacts to Transportation 176
Impacts to Solid Waste Facilities 177
Impacts to Socioeconomic Conditions 177
Impacts to Public Safety 177
ROUTE DIFFERENCES - PROPOSED ACTION AND AGENCY PREFERRED ALTERNATIVE 177
Norwood Area 179
Mancos Valley Area 182
NO ACTION ALTERNATIVE 185
UNCOMMITTED MITIGATION 185
Nitrogen Dioxide Emission for TransColorado Compressor Stations 185
IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES 186
RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY 187
CUMULATIVE IMPACTS 187

CHAPTER 5: EIS PREPARATION AND REVIEW 193
CONSULTATION AND COORDINATION 193
Federal Government Agencies 193
State Government Agencies 193
Indian Tribes 193
Local Governments 194
U.S. Senators and Representatives 194
Environmental Groups 194
Industries and Individuals 194

CONTENTS

DRAFT EIS PREPARERS AND REVIEWERS 194
ENSR Consulting and Engineering 194
BLM/Forest Service Core and Interdisciplinary Teams 196
Technical Review and Project Coordination 197
DRAFT EIS DISTRIBUTION 198

REFERENCES - GLOSSARY - ABBREVIATIONS AND ACRONYMS R-1

APPENDIX A - TRANSCOLORADO GAS TRANSMISSION PROJECT UTILITY CORRIDOR ANALYSIS FOR POSSIBLE FOREST LAND AND RESOURCE MANAGEMENT PLAN AMENDMENTS IN ASSOCIATION WITH THE PROPOSED TRANSCOLORADO GAS TRANSMISSION PROJECT A-1

APPENDIX B - ROUTE VARIATION FOR THE TRANSCOLORADO PROPOSED ROUTE AND THE AGENCY PREFERRED ROUTE B-1

APPENDIX C - WETLANDS AND STREAM CROSSINGS C-1

APPENDIX D - TRANSCOLORADO GAS TRANSMISSION PROJECT RECOMMENDED REVEGETATION SEED MIX D-1

APPENDIX E - THREATENED AND ENDANGERED SPECIES E-1

APPENDIX F - TRANSCOLORADO GAS TRANSMISSION PROJECT CULTURAL RESOURCES F-1

APPENDIX G - TRANSCOLORADO GAS TRANSMISSION PROJECT VISUAL RESOURCES G-1

CONTENTS

LIST OF TABLES

1-1 TransColorado Gas Transmission Project - Proposed Deliveries to the TransColorado System at Interconnection Points 4

1-2 TransColorado Gas Transmission Project - Related Projects 12

1-3 TransColorado Gas Transmission Project - Authorizing Actions 15

1-4 TransColorado Gas Transmission Project - County Land Use Plans and Permit Requirements 20

1-5 TransColorado Gas Transmission Project - TransColorado Public Scoping 23

2-1 TransColorado Gas Transmission Project - Land Ownership and Parallel Facilities - Proposed Action 30

2-2 TransColorado Gas Transmission Project - Potential Sources of Hydrostatic Test Water - Proposed Action and Agency Preferred Alternative 36

2-3 TransColorado Gas Transmission Project - Perennial Water Crossings - Proposed Action 38

2-4 TransColorado Natural Gas Transmission Project - Occurrence of Natural Resources - Proposed Action 40

2-5 TransColorado Gas Transmission Project - Pipeline System Components and Design - Proposed Action 2-5

2-6 TransColorado Gas Transmission Project - Description of Compressor Stations and Estimates of Pollutants - Proposed Action 44

2-7 TransColorado Gas Transmission Project - General Protection Measures 48

2-8 TransColorado Gas Transmission Project - Site-Specific Environmental Protection Measures 59

2-9 TransColorado Gas Transmission Project - Road and Area Closures - Proposed Action and Agency Preferred Alternative 64

2-10 TransColorado Gas Transmission Project - Recreationally and Economically Important Wildlife Species Located in the Vicinity of the TransColorado Proposed Action 65

2-11 TransColorado Gas Transmission Project - Land Ownership and Parallel Facilities - Agency Preferred Alternative 73

2-12 TransColorado Gas Transmission Project - Pipeline System Components and Design Preferred - Agency Preferred Alternative 74

LIST OF TABLES

2-13 TransColorado Gas Transmission Project - Perennial Water Crossings 75

2-14 TransColorado Gas Transmission Project - Occurrence of Natural Resources - Agency Preferred Alternative 77

2-15 TransColorado Gas Transmission Project Description of Compressor Stations and Estimates of Pollutants - Agency Preferred Alternative 79

2-16 TransColorado Gas Transmission Project - Recreationally and and Economically Important Wildlife Species Located in the Vicinity of the Agency Preferred Alternative 81

2-17 TransColorado Gas Transmission Project Route Differences - Proposed Route versus Agency Preferred Route - Norwood Area 84

2-18 TransColorado Gas Transmission Project - Route Differences - Proposed Route versus Agency Preferred Route - Mancos Area 87

2-19 TransColorado Gas Transmission Project - Summary Impact Comparisons between Proposed Action and Agency Preferred Alternative 92

3-1 TransColorado Gas Transmission Project - Summary of Temperature and Precipitation Data in Western Colorado and Northwestern New Mexico 98

3-2 TransColorado Gas Transmission Project - Landslide Features and Potentially Active Faults Crossed by Proposed and Agency Preferred Routes 100

3-3 TransColorado Gas Transmission Project Area - Noxious Weeds 112

3-4 TransColorado Gas Transmission Project - Forest Timber Characteristics 113

3-5 TransColorado Gas Transmission Project - Cultural Resources 118

3-6 TransColorado Gas Transmission Project - Typical Values of Yearly Day-Night Average Sound Levels 121

3-7 TransColorado Gas Transmission Project - Noise-Sensitive Receptors Within 1 Mile of Compressor Stations 123

3-8 TransColorado Gas Transmission Project - State and Federal Haul Routes 124

3-9 TransColorado Gas Transmission Project - 1989 County Government Statistics 126

3-10 TransColorado Gas Transmission Project - Estimated Housing Units and Vacancy Rates (1989) 128

LIST OF TABLES

3-11 TransColorado Gas Transmission Project - Estimates of Temporary Housing Availability Along Pipeline Route 129

3-12 TransColorado Gas Transmission Project - Parallel Facilities Mancos Valley Area - Proposed Action and Agency Preferred Alternative 132

4-1 TransColorado Gas Transmission Project - Air Quality Impacts at Proposed Compressor Station Sites 157

4-2 TransColorado Gas Transmission Project - Compressor Station Noise Impacts at Nearest Sensitive Receptors - Proposed Action 168

4-3 TransColorado Gas Transmission Project - Air Quality Impacts at Agency Preferred Alternative Compressor Station Sites 172

4-4 TransColorado Gas Transmission Project - Compressor Station Noise Impacts at Nearest Sensitive Receptors - Agency Preferred Alternative 178

4-5 TransColorado Gas Transmission Project - Irreversible, Irretrievable, Short-Term, Long-Term Commitment of Resources 188

4-6 TransColorado Gas Transmission Project - Existing and Projected Estimates for Surface Disturbance Activities Occurring within the Cumulative Study Area 190

LIST OF FIGURES

1-1 TransColorado Gas Transmission Project - Proposed Pipeline Route 2

1-2 TransColorado Gas Transmission Project - TransColorado Partners Systems 5

1-3 TransColorado Gas Transmission Project - Regional Natural Gas Production Basins 7

1-4 TransColorado Gas Transmission Project - Existing and Proposed Interstate Natural Gas Pipelines Serving West Coast and Midwestern Markets 9

2-1 TransColorado Gas Transmission Project - Proposed Action 31

2-2 TransColorado Gas Transmission Project - Typical Construction Spread 34

2-3 TransColorado Gas Transmission Project - Agency Preferred Route 71

3-1 TransColorado Gas Transmission Project - Slopes 135

3-2 TransColorado Gas Transmission Project - Geology 137

3-3 TransColorado Gas Transmission Project - Mineral Resources 139

3-4 TransColorado Gas Transmission Project - Soils 141

3-5 TransColorado Gas Transmission Project - Vegetation 143

3-6 TransColorado Gas Transmission Project - Game Animals 145

3-7 TransColorado Gas Transmission Project - Sensitive Wildlife Species 147

3-8 TransColorado Gas Transmission Project - Visual Resource Management Objectives 149

3-9 TransColorado Gas Transmission Project - Special Management Areas 151

3-10 TransColorado Gas Transmission Project - Mancos Valley Existing Utility Corridors 153

4-1 TransColorado Gas Transmission Project - Visual Impacts 193

MAPS

Land Ownership and Management Status Map . . . . . Map Pocket

CHAPTER 1

INTRODUCTION

INTRODUCTION

TransColorado Gas Transmission Company (TransColorado) proposes to construct, operate, and maintain a 302-mile, natural gas pipeline and associated facilities across Federal, state, and private lands between the Piceance Basin southwest of Meeker, Colorado, and Bloomfield, New Mexico (Figure 1-1 and maps in the back of this document). TransColorado is a joint venture among Questar TransColorado, Inc. (subsidiary of Questar Pipeline Company), WestGas TransColorado, Inc. (subsidiary of Western Gas Supply Company), and KN TransColorado, Inc. (subsidiary of KNEnergy). The three partners currently own and operate natural gas pipeline systems in the Rocky Mountain Region including Wyoming, Utah, New Mexico, and Colorado.

Before the pipeline can be constructed, TransColorado must obtain a variety of Federal, state, county, and local permits, rights-of-way (ROW), and licenses. Federal authorizations from the following agencies are required: the Bureau of Land Management (BLM), the Forest Service (USFS), the U.S. Army Corps of Engineers (COE), the Federal Energy Regulatory Commission (FERC). As part of the permitting process, the Federal agencies must analyze the impacts of the project under the National Environmental Policy Act (NEPA). In accordance with NEPA, an environmental impact statement (EIS) must be prepared for projects that are projected to have a significant Impact on the quality of the environment.

This draft EIS serves as the mechanism for satisfying the requirements of NEPA. It analyzes the environmental impacts of construction, operation, and maintenance of the pipeline. The BLM Montrose District Office has been designated the lead Federal agency for preparation of the draft EIS. The USFS and the FERC are cooperating Federal agencies with primary review responsibilities.

This draft EIS has been prepared by ENSR, an engineering and consulting firm, under the direction of the BLM and USFS.

PURPOSE OF AND NEED FOR THE PROJECT

The primary study area for this draft EIS is the nine counties in western Colorado and San Juan County, New Mexico (see maps in the back pockets of this document). TransColorado (1990) states that "the purpose of the proposed TransColorado Gas Transmission Project is to provide a regional natural gas transmission system to transport natural gas from the Western Slope of Colorado and the Rocky Mountain region to major interconnections with other interstate pipelines for ultimate delivery to Southwest, Midwest, and California markets." The pipeline has been designed to transport 300 million cubic feet of natural gas per day (MMcfd).

TransColorado indicates that the need for natural gas transportation services varies with demand. Demand varies seasonally. Demand also varies in response to changes in industrial activity and fluctuating fuel prices. In areas where multiple pipelines provide transportation service, brokers attempt to purchase gas that can be transported and delivered to end-use markets at the lowest cost. Under deregulated market assumptions, TransColorado believes that natural gas prices in areas that are served by multiple natural gas sources and transportation systems are strongly influenced by competition among suppliers. Under these "free market" assumptions, natural gas pipeline companies are expected to be highly competitive with each other, and to develop pipeline systems that have the flexibility to respond to the demands of a variety of markets in a cost-competitive manner.

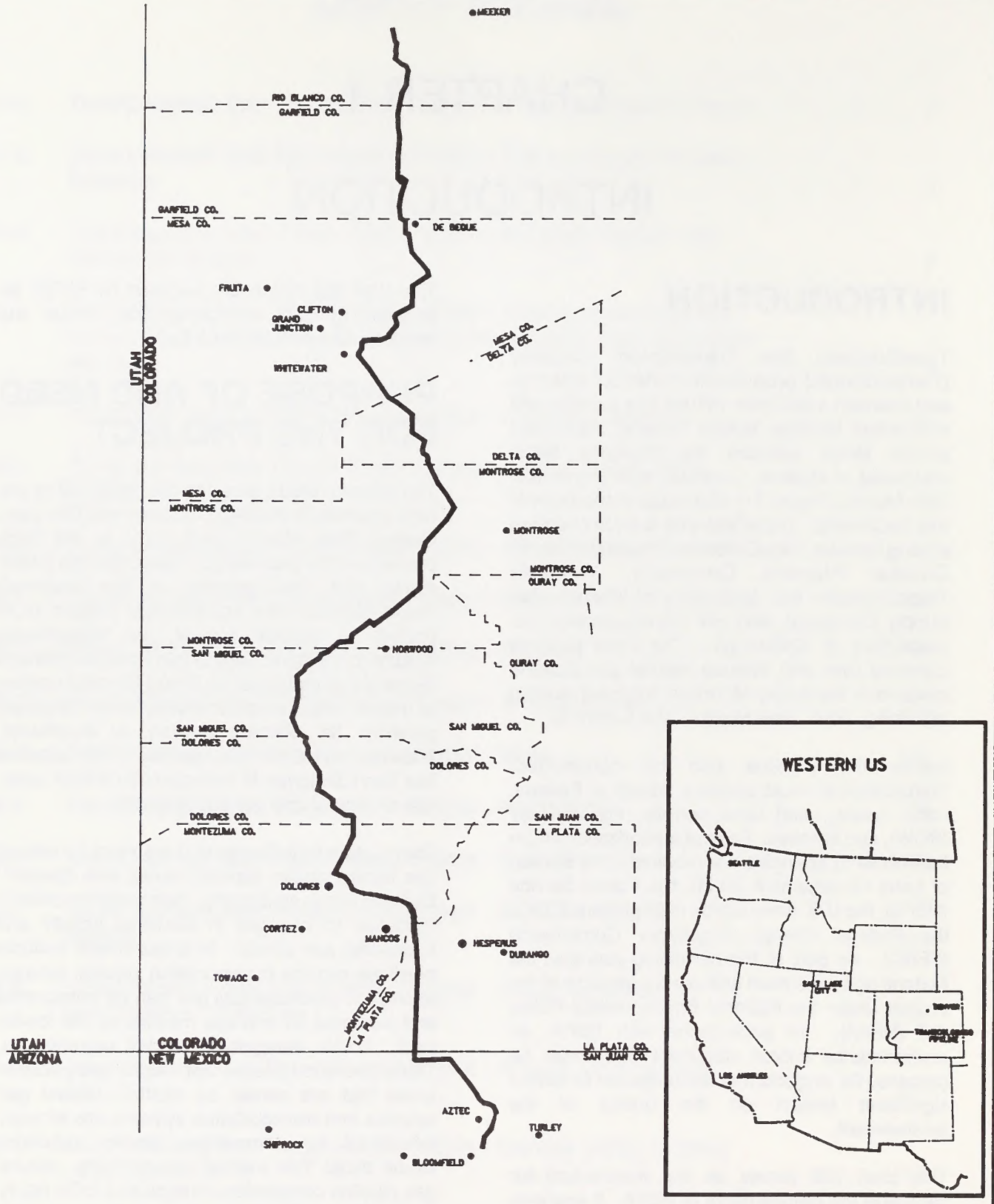


Figure 1-1
PROPOSED PIPELINE ROUTE

TransColorado Gas Transmission Project

ENSR

REV. 7/1/91 HTR 4/23/91 HTR 2823

The FERC, which has the responsibility to regulate interstate natural gas transmission, developed its optional certificate program in orderto meet the following goals: (1) to provide the full benefits of competition to consumers by facilitating easier entry and exit from services; (2) to ensure the most efficient scale for facilities by removing certification as a barrier to entry; and, (3) to provide incentives for competition where none exists by maximizing the use of alternative market access for producers and consumers. Under this process, the applicant is not required to file market or gas supply data to the FERC to determine public convenience and necessity, and the application review times are reduced. In return, the applicant must assume full economic risk for the project, and must provide open-access transportation to gas suppliers.

On July 20, 1990, TransColorado filed an application with the FERC (Docket No. CP90-1777-000) for an optional certificate. On December 20, 1990, FERC issued a preliminary determination granting that certificate authorization of TransColorado's facilities solely on the basis of non-environmental issues would be in the public convenience and necessity. In its findings, the FERC stated that the project has firm backing from its partners, would provide an advantageous configuration for the supply areas that the pipelne would serve, and would substantially enhance transportation options in the Rocky Mountain area. The FERC noted that TransColorado pipeline would be an additional north-south transportation bridge in the Rocky Mountain Region along with the transmission system of Northwest Pipeline Corporation (Northwest). The FERC stated that the TransColorado pipeline would act as a stimulus to additional development of gas reserves in the Rocky Mountain region adjacent to the pipeline.

NATURAL GAS SUPPLY AND DEMAND

Natural Gas Uses and Demands in the Midwest and California

TransColorado believes there is a large market for natural gas in the Midwest and California. In the Midwest, natural gas is used to fuel industrial boilers and turbines to generate electrical energy and to provide residential and industrial space heating. In addition to the uses described for the Midwest, large volumes of natural gas are used in southern California to generate steam for the secondary recovery of heavy crude oil in the southern Central Valley oil fields. There is also an increased demand for natural gas to fuel vehicle fleets.

Amendments to the Clean Air Act have contributed to increased demand for natural gas. In an effort to clean up the air, major metropolitan areas throughout the United States are substituting natural gas for other hydrocarbon fuels to reduce the pollutant quantities that lead to the formation of ozone and nitrogen oxides.

Natural Gas Supply in Western Colorado

In addition to the "free market" system, a Federal subsidy to encourage companies to develop non-conventional energy sources has contributed to increased natural gas supplies. In 1980, the U.S. Department of Energy (DOE) initiated a 10-year program to encourage the development of these sources, which included coal bed methane. Over the past 10 years, numerous new wells have been drilled into coal bed methane sources in northwestern Colorado (Piceance Basin), southwestern Colorado, and northwestern New Mexico (San Juan Basin). Combined with existing shut-in wells in northwestern Colorado, the newer coal bed methane wells will require new gathering systems and interstate transmission pipelines to transport this gas. Congress re-authorized the non-conventional energy program in 1990, which is expected to stimulate additional drilling.

TRANSCOLORADO PARTNER SYSTEMS

Figure 1-2 shows locations of the existing gathering, transmission (intrastate and Interstate) and distribution systems of the TransColorado partners and the interconnections to the proposed TransColorado pipeline. Figure 1-3 illustrates the major gas supply basins in western Colorado and southern Wyoming. Table 1-1 provides estimates of the gas to be delivered to the TransColorado system at the various interconnection points along the line.

TABLE 1-1

TransColorado Gas Transmission Project
Proposed Deliveries to the TransColorado System
at Interconnection Points

Supplier	Interconnect Point	MilePost	Gas Volume (MMcfd)
Questar	Big Hole	0.0	156.7
WestGas	Meeker	2.7	35.0
Rocky Mountain	DeBeque	41.0	50.0
WestGas	DeBeque	48.5	35.0
Rocky Mountain	Big Gypsum	165.7	25.0
Total			301.7

Source: TransColorado 1990.

Gas supplies for the TransColorado pipeline system would be provided from existing and future conventional and coal bed methane wells. Environmental documentation is carried out on all wells located on Federal lands at the time well development is initiated. These environmental documents are available for review at the appropriate Federal agency office.

End uses of the natural gas shipped on the TransColorado system are assumed to be for use in industrial applications to generate steam and electricity, to heat residences, and to power vehicles.

Western Gas Supply

Western Gas Supply (WestGas) natural gas gathering and distribution pipelines are entirely within Colorado. The system consists of small-diameter (4-inch to 12-inch) pipelines. These pipelines deliver natural gas from the Piceance Basin, the Douglas Creek fields near Rangely, and the Colorado River drainage near DeBeque in Rio Blanco and Garfield Counties, Colorado to the following customers: power plant customers at Craig, Hayden, and Cameo; oil refinery customers in Fruita and Rangely, and residential users in the Grand Valley and Yampa Valley and Public Service Company of Colorado, which distributes gas to residential and commercial customers along the Front Range (Figure 1-2).

KNEnergy

KNEnergy (Rocky Mountain Natural Gas) has natural gas gathering and distribution pipelines located within Colorado. The system consists of small-diameter (6-inch to 10-inch) pipelines. These pipelines deliver natural gas from the Plateau Creek drainage of Mesa County, the Piceance Basin, and the Paradox Basin near the Dolores River (Figure 1-2) to communities in the Grand and Gunnison Valleys in Mesa, Delta, Garfield, Pitkin, and Eagle Counties.

Questar Pipeline Company

Questar Pipeline Company is an interstate pipeline company that provides transportation and storage service through two east-west transmission systems: The northern system extends across southwestern Wyoming and connects Wyoming gas fields with the distribution network of Mountain Fuel Supply Company (Mountain Fuel) in the Salt Lake City metropolitan area; the southern system links the Uinta Basin in northeastern Utah and the Piceance Basin in northwestern Colorado with the Mountain Fuel

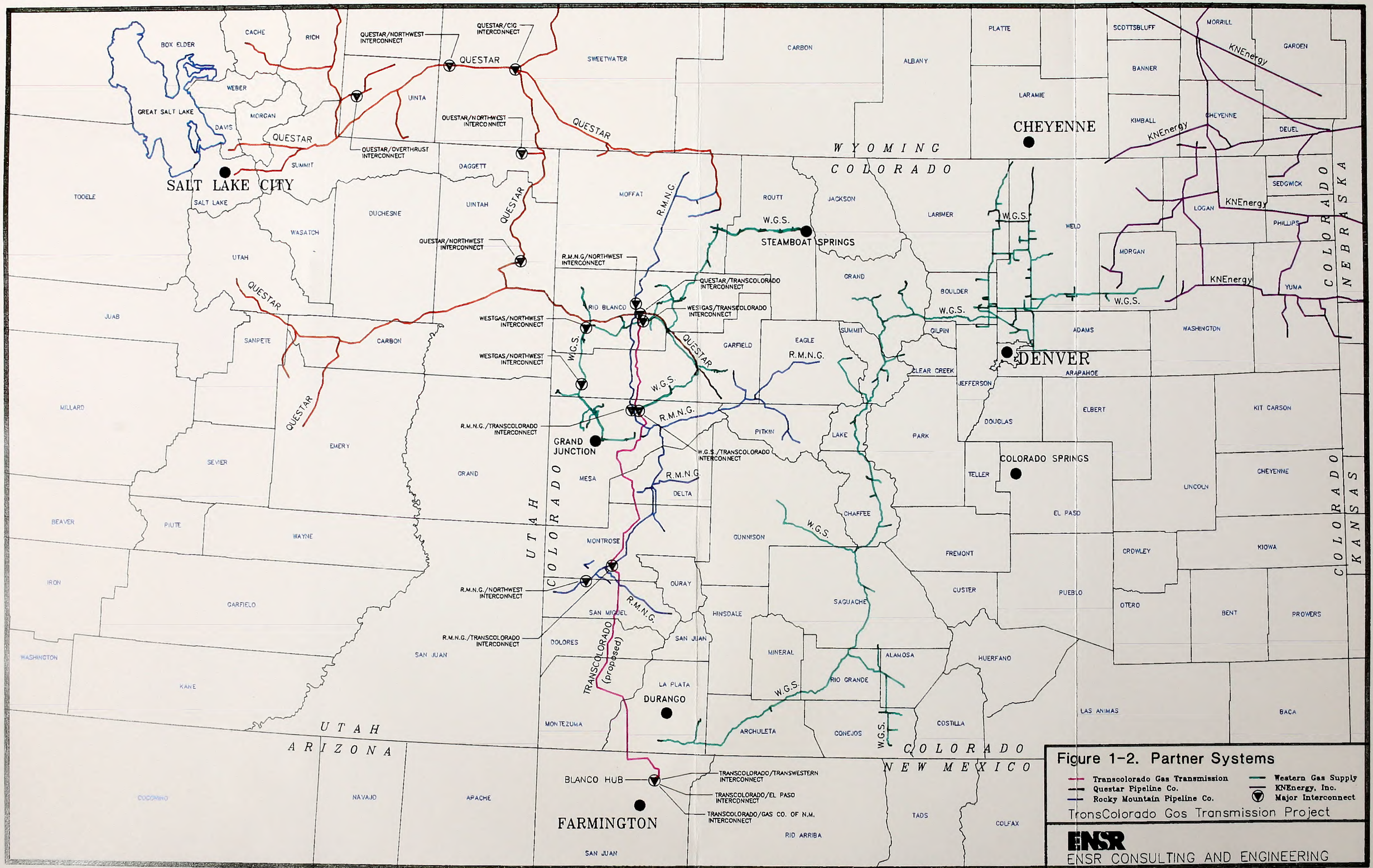


Figure 1-2. Partner Systems

- Transcolorado Gas Transmission
- Questar Pipeline Co.
- Rocky Mountain Pipeline Co.
- Western Gas Supply
- KNEnergy, Inc.
- Major Interconnect

TronsColorado Gos Transmission Project

ENSR CONSULTING AND ENGINEERING

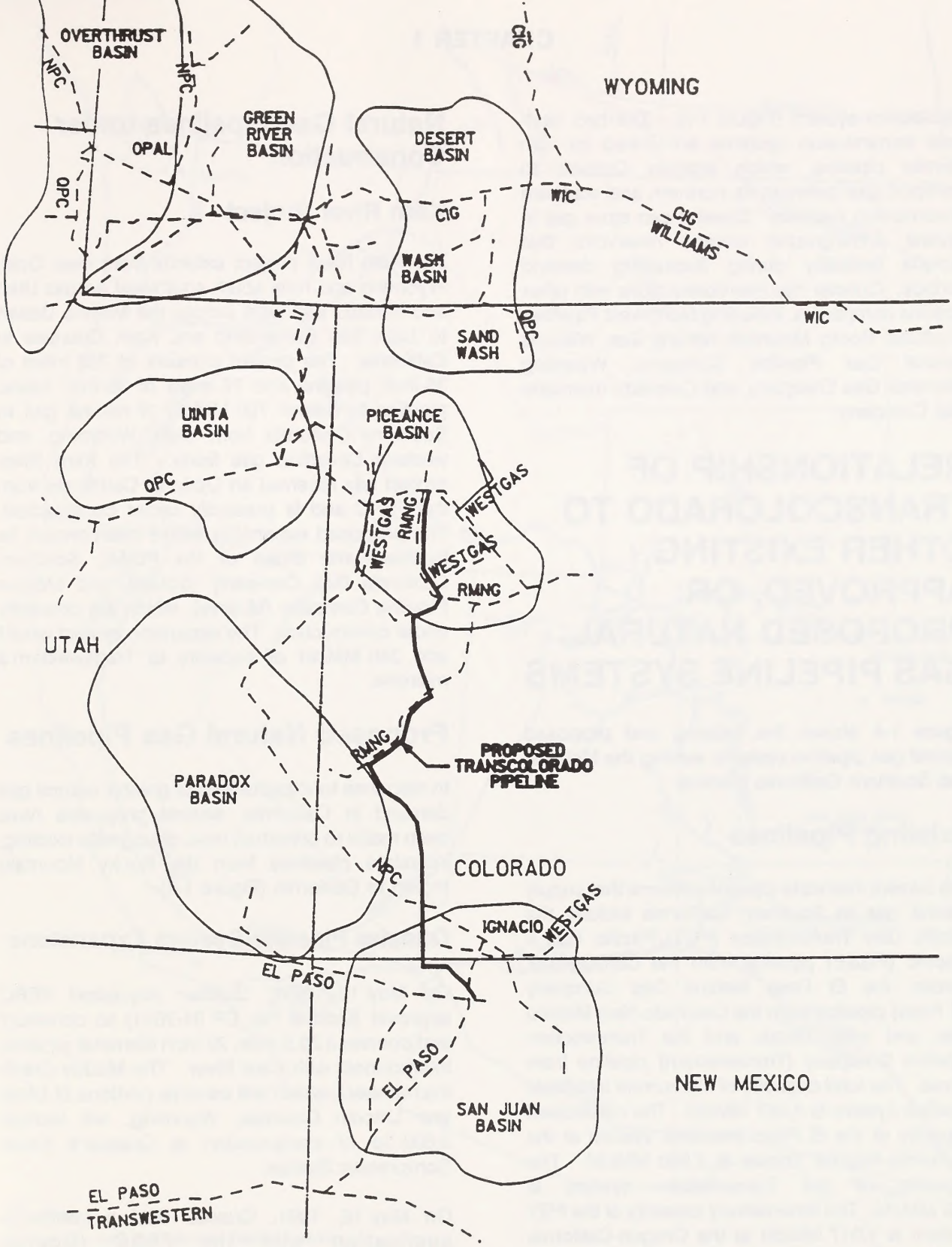


Figure 1-3 REGIONAL NATURAL GAS PRODUCTION BASINS

TransColorado Gas Transmission Project

ENSR

4/22/91 HTR 28190

distribution system (Figure 1-2). The two east-west transmission systems are linked by an 81-mile pipeline, which enables Questar to transport gas between its northern and southern transmission systems. Questar can store gas in several underground storage reservoirs that provide flexibility during fluctuating demand periods. Questar has interconnections with other pipeline companies, including Northwest Pipeline, WestGas, Rocky Mountain Natural Gas, Williams Natural Gas Pipeline Company, Wyoming Interstate Gas Company, and Colorado Interstate Gas Company.

RELATIONSHIP OF TRANSCOLORADO TO OTHER EXISTING, APPROVED, OR PROPOSED NATURAL GAS PIPELINE SYSTEMS

Figure 1-4 shows the existing and proposed natural gas pipeline systems serving the Midwest and Southern California markets.

Existing Pipelines

The current interstate pipeline systems that supply natural gas to Southern California include the Pacific Gas Transmission (PGT)/Pacific Gas & Electric (PG&E) pipeline from the Canada-U.S. border, the El Paso Natural Gas Company (El Paso) pipeline from the Colorado-New Mexico area and west Texas, and the Transwestern Pipeline Company (Transwestern) pipeline from Texas. The total capacity of the current interstate pipeline system is 4,657 MMcfd. The certificated capacity of the El Paso interstate system at the California-Arizona border is 2,890 MMcfd. The capacity of the Transwestern system is 750 MMcfd. The firm-delivery capacity of the PGT system is 1,017 MMcfd at the Oregon-California border.

Natural Gas Pipelines under Construction

Kern River Project

The Kern River project extends from near Opal, Wyoming and runs south-southwest across Utah and Nevada and west across the Mojave Desert to both San Bernardino and Kern Counties in California. The project consists of 762 miles of 36-inch pipeline and 75 miles of 30-inch lateral pipeline to deliver 700 MMcfd of natural gas to Southern California from Utah, Wyoming, and western Canadian gas fields. The Kern River project has received an Optional Certificate from the FERC and is presently under construction. The proposed expansion would interconnect its facilities with those of the PG&E, Southern California Gas Company (SoCal), and Mojave Pipeline Company (Mojave), which are presently under construction. The expansion project would add 340 MMcfd of capacity to Transwestern's mainline.

Proposed Natural Gas Pipelines

In response to expectations of greater natural gas demand in California, several proposals have been made to construct new, or upgrade existing, interstate pipelines from the Rocky Mountain region to California (Figure 1-4).

Questar Pipeline System Expansions

On May 13, 1991, Questar requested FERC approval (Docket No. CP 91-2021) to construct and operate a 20.5-mile, 20-inch diameter pipeline interconnect with Kern River. The Muddy Creek interconnect, which will traverse portions of Uinta and Lincoln Counties, Wyoming, will include 5,600 hp of compression at Questar's Eakin Compressor Station.

On May 16, 1991, Questar filed a certificate application with the FERC (Docket No. CP 91-2067-000) to construct and operate a 10,350 hp compressor station, the Piceance Creek Compressor Station, adjacent to Questar's southern transmission system in Rio Blanco County, Colorado. The installation of this compressor station will allow Questar to receive,

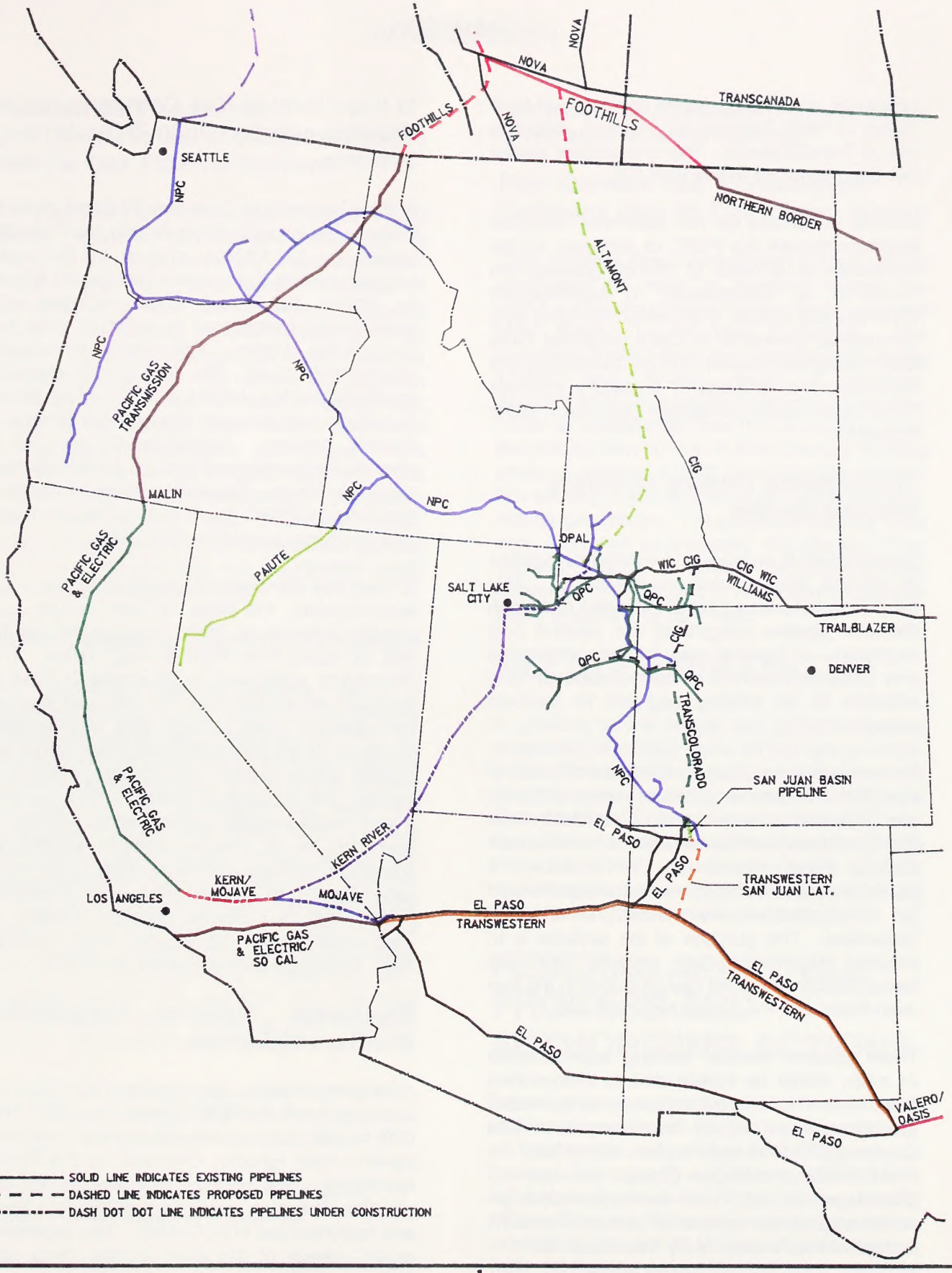


Figure 1-4

EXISTING AND PROPOSED INTERSTATE NATURAL GAS PIPELINES SERVING WEST COAST AND MIDWESTERN MARKETS

TransColorado Gas Transmission Project

ENSR

REV. 7/2/91 HTR 4/22/91 HTR 2889

compress, and deliver natural gas destined for a variety of other transmission systems, including that of TransColorado. This compressor station has been analyzed in this draft EIS.

Questar will shortly file two additional certificate applications with the FERC to propose: (1) the installation of 46 miles of 20-inch pipeline and 14,508 hp of compression in southwestern Wyoming and eastern Utah, which will serve as a competitive alternative to CIG's proposed Uinta Basin lateral (see below), and (2) the looping and replacement of portions of Questar's southern transmission system in eastern Utah and western Colorado.

Transwestern Pipeline Company Mainline System

Transwestern is proposing to expand its mainline in Arizona and western New Mexico. This expansion includes a total of 195 miles of 30-inch diameter pipeline comprising five pipeline loop segments. A pipeline loop involves installation and interconnection of a new section of pipe adjacent to an existing segment to increase capacity.

Transwestern also plans to construct 97 miles of new 30-inch diameter pipeline from the Blanco gas processing center near Bloomfield, New Mexico to a point on Transwestern's mainline near Gallup, New Mexico. In addition, a 12,408 horsepower (hp) compressor station would be constructed at the northern terminus at Bloomfield. The purpose of the facilities is to provide 520 MMcfd of capacity for the transportation of natural gas produced in the San Juan Basin and the Rocky Mountain area.

Three pipeline laterals, totalling approximately 24 miles, would be constructed to interconnect Transwestern's mainline system to other natural gas systems owned by Southern Union Gas Company (Flagstaff and Kingman laterals) and the PG&E, SoCal, and Mojave (Topock Interconnect) (Fort Mojave lateral). Transwestern plans to begin construction in the summer of 1991 and have the project with an in-service by December 1991.

El Paso Natural Gas Company Mainline and San Juan Triangle Systems

El Paso Natural Gas Company (El Paso) plans to increase the capacity along its San Juan Triangle system by 835 MMcfd, expand its San Juan mainline system from approximately 400 MMcfd to about 806 MMcfd, and increase gas compression horsepower to transport more gas through the system. This expansion includes 11 segments of 42-, 36-, and 34-inch diameter looping along the existing systems, which would be constructed between Blanco, New Mexico to Topock, Arizona. TransColorado currently is planning to interconnect with the existing El Paso system at Blanco. Depending upon the approval date from the FERC, the El Paso expansion would be placed into service by April 1992.

El Paso has also filed with the FERC to construct approximately 110 miles of new natural gas pipeline between its Plains Compressor Station and its Waha Field Plant in west Texas. This 680 MMcfd expansion would enable El Paso to transport natural gas from the San Juan Basin of northwestern New Mexico and southwestern Colorado to the East-End system for further off-system transportation and ultimate delivery to eastern and midwestern United States markets. It also would provide greater overall flexibility in operation of El Paso's pipeline system by enabling it to move additional volumes of natural gas between its Permian-San Juan Crossover system and its California Mainline system. El Paso plans to begin construction in late summer 1991, pending certification from the FERC.

Northwest Pipeline Corporation (Northwest) System

Northwest Pipeline Corporation has filed an application with the FERC (Docket No. CP91-780-000) to add compression and expand its existing pipeline from Ignacio, Colorado, to the Pacific Northwest. The primary gas sources for this pipeline expansion would be the San Juan Basin and imported gas from Canada. This expansion would consist of 625 miles of new, loop, and replacement lines of various diameters.

Pacific Gas Transmission (PGT)/Pacific Gas and Electric (PG&E) Natural Gas Pipeline Systems

The proposed PGT/PG&E pipeline project would deliver Canadian and United States gas to California municipal and utility customers (FERC 1991). The PGT/PG&E project consists of 845 miles of 42- and 36-inch diameter pipeline loops of an existing pipeline system in which pipeline loops and compression would be added to increase capacity. This system extends from an interconnect with the Alberta Natural Gas Company at the Canadian border southward across Idaho, Washington, and Oregon, to a terminus in the Central Valley of California. This project would transport 903 MMcfd. Depending upon the approval date from the FERC, construction of portions of the proposed pipeline would begin in mid-1992 and the pipeline would be in-service November 1993.

Altamont Natural Gas Pipeline System

The proposed Altamont pipeline, which is represented by a consortium of gas producers and utilities, would be a new 620-mile long, 30-inch pipeline that would extend from the Canadian border southward across Montana and western Wyoming to an interconnection with the Northwest Pipeline and Kern River pipeline systems at Opal, Wyoming. At Opal, the pipeline would interconnect with the Kern River pipeline, which is presently being constructed. Depending upon the approval from the FERC, construction of the proposed pipeline would begin in early 1993, with an in-service date being in December 1993. Altamont would be supplied by imported Canadian gas, and Wyoming and Montana sources. This project would transport 719 MMcfd.

Altamont has entered an agreement with the Kern River pipeline project for the Kern River system to carry Altamont gas to southern California.

Colorado Interstate Gas Company Uinta Basin Lateral Pipeline

Colorado Interstate Gas Company (CIG) has filed an application with the FERC (Docket No. CP 91-1110-000) requesting authority to construct the Uinta Basin lateral, a 223-mile, 20-inch pipeline from Uintah County in eastern Utah to the vicinity of Wamsutter in central Wyoming.

Four Corners Gas Transmission Company Line 90 Conversion Project

Four Corners Gas Transmission Company has announced its intent to transport natural gas along a 490-mile pipeline system from northwest New Mexico to Southern California. The proposed facility would be comprised of existing 12-inch and 16-inch crude oil pipelines. Approximately 23.5 miles of natural gas pipeline would be constructed from the Blanco Plant near Bloomfield, New Mexico to Four Corners' existing crude oil pipeline at Bisti Junction, New Mexico. The existing crude oil lines would be converted to natural gas service. The proposed facilities have been designed to transport 100 MMcfd. Four Corners intends to initiate construction and conversion in the spring of 1992, with the pipeline being in-service by July 1993.

RELATED PROJECTS

In addition to the natural gas pipeline systems previously described, other oil and gas projects, waste cleanup projects, and water development projects that are operating or may be constructed during the TransColorado construction and short-term (5-year) operational periods are presented in Table 1-2. These projects provide the basis for evaluating the cumulative effects of constructing and operating the TransColorado project.

FEDERAL APPROVAL PROCESS AND AUTHORIZING ACTIONS

Following acceptance of the final draft EIS and project approval, each Federal agency will issue an appropriate right-of-way (ROW), permit, or license. The agency authorization will list any stipulations required. The BLM Montrose District Office will issue a ROW grant for lands under the jurisdiction of the BLM and Forest Service. Table 1-3 lists the various Federal, state, and local government agencies with permitting authority. It also lists types of permits needed by TransColorado.

TABLE 1-2

TransColorado Gas Transmission Project - Related Projects

Project Description	Status	Location	Comments
Pipelines			
Rocky Mtn. Natural Gas	In Operation	Western Colorado	2,000 miles of pipeline 50-foot right-of-way (ROW)
WestGas	In Operation	Western Colorado	798 miles of pipeline 50-foot right-of-way (ROW)
MAPCO Liquids	In Operation	Texas to Wyoming	1,172 miles of pipeline 15- to 50-foot ROW
Shell CO_2	In Operation	Montezuma and La Plata Counties, Colorado San Juan County, New Mexico (adjacent to TransColorado in La Plata, and San Juan Counties)	478 miles of pipeline 65-foot ROW
NWPL	In Operation	Bloomfield, New Mexico to Ignacio, Colorado	33.4 miles 30-inch pipeline
Kern River	Under Construction	Opal, Wyoming to Southern California	837 miles, 30- to 36-inch line
Questar Upgrade	Application Filed	Utah to Rio Blanco County	Replace existing line with 20-inch line
Questar Upgrade	Application Filed	Rio Blanco and Garfield Counties, Colorado	Replace with 14-inch line
Colorado Interstate Gas	Application Filed	Utah to Wyoming	20-inch line, 50-foot ROW, Compressor stations in Rio Blanco County

TABLE 1-2 (CONTINUED)

Project Description	Status	Location	Comments
ENRON/Transwestern	Application Filed	Bloomfield, New Mexico to Topock, Arizona	316 miles of 30-, 24-, and 6-inch new and loop line
EPNG	Application Filed	Bloomfield, New Mexico to Topock, Arizona	231 miles of 42-, 36-, and 34-inch loop line
NWPL	Application Filed	Ignacio, Colorado to Pacific Northwest	625 miles of new, loop, and replacement lines in six states
Questar Pipeline	Announced	Cascade Gulch to Parachute, Colorado	
Four Corners/System 90	Announced	Bloomfield, New Mexico to Southern California	490 miles 12-inch and 16-inch line
Gas Gathering System			
Amoco Gas Gathering	In Partial Operation	San Juan County, New Mexico	Coal bed methane, 89 miles of pipeline, 29 wells
Meridian Val Verde System Gathering	In Partial Operation	San Juan and Rio Arriba Counties, New Mexico	257 miles of coal bed methane recovery pipeline
Meridian Central Delivery Points	In Partial Operation	San Juan County, New Mexico	9.4 miles pipelines
Blackwood and Nichols	In Partial Operation	San Juan County, New Mexico	64.4 miles of coal bed methane recovery pipeline
Oryx Coal Bed Methane Development	Application Filed	Mesa and Garfield County, Colorado	20 coal bed methane wells, 10-acre gas treatment facility
Phillips Gas Gathering Project	Application Filed	San Juan County, New Mexico	160 miles 4-inch to 10-inch line coal bed methane recovery

TABLE 1-2 (CONTINUED)

Project Description	Status	Location	Comments
Union Oil	Application Filed	San Juan County, New Mexico	17 miles of gas recovery pipeline
Gas Plants			
Ignacio NWPL Gas Plant	In Operation	La Plata County, Colorado	
Blanco EPNG Gas Plant	In Operation	Bloomfield, San Juan County, New Mexico	
Water Projects			
Florida Irrigation Project	In Operation	La Plata County, Colorado	
Jackson Gulch Reservoir	In Operation	Montezuma County, Colorado	
Dolores Irrigation Project	Under Construction	Montezuma and Dolores Counties, Colorado	
Animas-La Plata Project	Application Filed	La Plata County, Colorado San Juan County, New Mexico	
Other Projects			
UMTRAP	In Operation	Grand Junction (Mesa County), Naturita (Montrose County), Slick Rock (Montrose County), and Durango (La Plata County) Colorado	The Cheney disposal site for contaminated tailings is located approximately 0.1 mile from MP 90.0 of the proposed and agency preferred routes.

Note:

CIG - Colorado Interstate Gas Company
NWPL - Northwest Pipeline
EPNG - El Paso Natural Gas Pipeline
UMTRAP - Uranium Mill Tailings Remedial Action Program

TABLE 1-3

TransColorado Gas Transmission Project
Authorizing Actions

Agency	Jurisdiction	Grant, Permit, or License Required
Federal		
U.S. Department of the Interior		
Bureau of Land Management	Administration of public lands	ROW grant on Public and National Forest lands (Temporary Use Permits on BLM lands)
Fish and Wildlife Service	Protection of T&E species	Section 7 consultation
	Fish and Wildlife Coordination Act	Section 404 and Section 10 Permits
Advisory Council on Historic Preservation	Protection of cultural resources	Sec. 106 Compliance (36 CFR 800)
Bureau of Indian Affairs	Administration of Indian Lands	ROW grant (25 CFR 169)
Bureau of Reclamation	Canal Crossings and Reclamation Lands	ROW grant
U.S. Department of Agriculture		
Forest Service	Administration of National Forest lands	ROW grant (issued by BLM) and Temporary Special Use Permits issued by Forest Service
Soil Conservation Service	Protection of prime and unique farmlands	Clearance
Federal Energy Regulatory Commission (FERC)	Interstate natural gas transportation facilities	Public Certificate of Convenience and Necessity
U.S. Army Corps of Engineers	River and wetland crossings	Section 404 Permits
U.S. Environmental Protection Agency	NEPA compliance	Adequacy of EIS
Western Area Power Administration	Power Marketing	Conditions of approval

TABLE 1-3 (CONTINUED)

Agency	Jurisdiction	Grant, Permit, or License Required
U.S. Department of Transportation	Crossings of interstate and state highways and other pipelines	Permit
States of Colorado and New Mexico		
Department of Local Affairs, Division of Planning	Administration of state lands	Consultation
State Historic Preservation Officer	Protection of historic and cultural resources	Consultation
State Engineer	Appropriation of water	Consultation
Division of Wildlife	Administration of fish and wildlife program	ROW across state lands
Department of Health, Air Pollution and Water Quality Control Divisions	Air and water quality	Water quality certificates, air emission permits, and hydrostatic discharge permits
Counties		
County Commissioners in Rio Blanco, Garfield, Mesa, Montrose, Delta, San Miguel, Dolores, La Plata, and Montezuma Counties (Colorado)	County zoning	Special use permits
County Highway Departments in Rio Blanco, Garfield, Mesa, Montrose, Delta, San Miguel, Dolores, La Plata, and Montezuma Counties (Colorado)	County roads	Special use permits
County Highway Department in San Juan County (New Mexico)	County Roads	Special use permits

RELATIONSHIP TO BLM AND FOREST SERVICE POLICIES, PLANS, AND PROGRAMS

Federal land management agencies are mandated by law to prepare land use plans for managing Federal lands under their jurisdiction. These laws also require Federal agencies to analyze the environmental impacts of implementing their land use plans. To comply with these laws, BLM prepares resource management plans (RMPs) and EISs for lands under its jurisdiction. The Forest Service prepares Forest Land and Resource Management Plans (forest plans) and EISs for lands under its jurisdiction.

According to BLM and Forest Service policy, all actions authorized subsequent to the plans (RMPs and Forest Plans) must be in conformance with the approved land use plans. To be in conformance, an action must be specifically mentioned in the plan or clearly consistent with the decisions of the plan. In addition, to be clearly consistent, an action must comply with: (1) all stipulations, constraints, standards, and guidelines listed in a plan, and (2) all stipulations developed specifically for the proposed project for the purpose of avoiding or reducing impacts on sensitive resources in the plan.

The BLM and Forest Service have reviewed the proposed TransColorado project to determine conformity with approved land use plans. Following are the findings of this review.

Bureau of Land Management

White River Resource Area (Colorado)

The White River Resource Area is managed under two land use plans--the White River Management Framework Plan (MFP) and the Piceance Basin Resource Management Plan (RMP). The proposed TransColorado pipeline is consistent with these plans subject to: (1) a general stipulation in the Piceance Basin RMP to mitigate the losses of livestock range and firewood; (2) site-specific RMP stipulations, such as seasonal closures; and (3) other general stipulations needed to reduce or eliminate impacts to resources. These stipulations have been placed in Chapter 2.

Grand Junction Resource Area (Colorado)

The Grand Junction Resource Area is managed under the Grand Junction RMP. The proposed TransColorado pipeline is consistent with the Grand Junction RMP subject to: (1) site-specific stipulations to mitigate impacts in the Palisade watershed and on slopes greater than 40 percent, (2) site-specific RMP stipulations such as seasonal closures, and (3) other general stipulations needed to reduce or eliminate impacts to resources. These stipulations have been placed in Chapter 2.

Uncompahgre Basin Resource Area (Colorado)

The Uncompahgre Basin Resource Area is managed under the Uncompahgre Basin RMP and the San Juan/San Miguel RMP. The proposed TransColorado pipeline is consistent with the Uncompahgre Basin RMP subject to: (1) site-specific RMP stipulations such as seasonal closures, and (2) other general stipulations needed to reduce or eliminate impacts to resources. These stipulations have been placed in Chapter 2.

San Juan Resource Area (Colorado)

The San Juan Resource Area is managed under the San Juan/San Miguel RMP. The proposed TransColorado pipeline is consistent with the San Juan RMP subject to: (1) site-specific RMP stipulations such as seasonal closures and (2) other general stipulations needed to reduce or eliminate impacts to resources. These stipulations have been placed in Chapter 2.

Farmington Resource Area (New Mexico)

The Farmington Resource Area in New Mexico is managed under the Farmington RMP. The San Juan Resource Area has stated that the proposed TransColorado pipeline is consistent with the Farmington RMP subject to: (1) site-specific RMP stipulations such as seasonal closures and (2) other general stipulations needed to reduce or

eliminate impacts to resources. These stipulations have been placed in Chapter 2.

U.S. Forest Service

Uncompahgre and San Juan National Forests

The Ouray and Norwood Ranger Districts (Uncompahgre National Forest) are managed under the Grand Mesa, Uncompahgre, and Gunnison National Forest Land and Resource Management Plan (forest plan). The Dolores and Mancos Ranger Districts are managed under the San Juan National Forest Land and Resource Management Plan (forest plan). Both forest plans were approved in 1983 and require utility corridors be compatible with the goals of the management areas through which they pass. Any activity within a designated utility corridor must be consistent with the appropriate standards and guidelines in the forest plan. Both forest plans also require that any major pipeline (10 inches or larger) be placed in a designated utility corridor. Portions of the TransColorado proposed and agency preferred routes and route variations (see Appendix B) on both forests are not within a designated utility corridor. Before any of these routes could be used for this project, a forest plan amendment would be needed to designate them as utility corridors (see Appendix A). TransColorado route segments not designated as utility corridors are:

Uncompahgre National Forest, Norwood Ranger District

- Agency preferred route in T43N, R13W, Sec 23.

San Juan National Forest, Dolores and Mancos Ranger Districts

- Proposed route: (1) in the Ryman Creek area, (2) where the route leaves the 230 and 345 kV power lines northwest toward Ryman Creek, (3) from the 230 kV power line above Dolores going southeast to Mancos Hill.

- Mancos Valley East Route Variation (see Appendix B) (designated now only for power lines).

The Proposed Action and Agency Preferred Alternative are consistent with both forest plans subject to the following: (1) site-specific restrictions such as area and seasonal closures (listed in Chapter 2); (2) use of the general environmental protection measures listed in Chapter 2; (3) site-specific mitigation measures being developed this field season for the final EIS; and (4) amending the appropriate Forest Plan to include new utility corridors.

RELATIONSHIP TO INDIAN TRIBAL POLICIES AND PLANS

The Ute Mountain Ute and Navajo Reservations, located in southern Colorado and northern New Mexico, are crossed by the San Juan Valley route variation (see Appendix B). The Southern Ute reservation located in southern Colorado is crossed by the Animas Valley route variation (Appendix B). The Proposed Action and the Agency Preferred Alternative would follow a strip of private land along the La Plata River drainage between two areas of the Southern Ute and Ute Mountain Ute reservations.

Currently, these three reservations do not zone or classify land for specified land use. There are no existing land use or comprehensive plans. Development projects are subject to review by the individual tribal councils. Construction inspections, threatened and endangered species surveys, and archaeological surveys are typically required.

Procedures for granting pipeline ROWs on reservation land begin with simultaneous application submittals to the Bureau of Indian Affairs (BIA) and the respective tribal councils. Reviews and inspections are conducted within the framework of the tribe. Typical reviews include archaeological, geological, and economic assessments. Simultaneously, a prospective applicant may request "access" or "crossing" permits to conduct land, threatened and endangered species, and cultural resources surveys. The tribal council is the decision-making body for the ROW permits. The tribal council may enter into negotiations with the pipeline ROW applicant. There are no adopted standards or requirements for such negotiations. If the tribal

council approves the ROW, this approval is communicated to the BIA and a ROW is granted pursuant to the conditions imposed by the tribal council. The tribal council has the right to approve or disapprove of the granting of any ROW per the Act of February 5, 1948, 62 Stat 17 (25 USCA 323-328). There are certain standard stipulations contained in the Act.

Trust Roles and Responsibilities

The trust responsibility is the term used to characterize the legal relationship between the United States and the various Indian tribes. It has its origins in the assertions by the Federal government of the power to control the sale of Indian land. That power was assented to prior to the independence of the United States in the Royal Proclamation of 1763 and after independence in the Indian Trade and Intercourse Act, which was passed by the first Congress in 1790 (25 USCA 177). The courts have held that with the authority to manage that property comes the responsibility to do it with care and prudence and for the benefits of the Indian owners (United States v. Mason, 412 U.S. 391, 398, 1973). In addition to these obligations of the United States with respect to the management of Indian property, the United States also has a more general trust relationship between the United States and the Indian people. (United States v. Mitchell, 463 U.S. 206, 225, 1983 [Mitchell II]). That relationship creates an overriding duty of our Federal government to deal fairly with all Indians (Morton v. Ruiz, 415 U.S. 199, 236, 1974). The trust responsibility applies not only to the Interior Department but to all other agencies of the Federal government as well (Covelo Indian Community v. FERC, 895 F.2d 581, 9th Cir. 1989. FERC); (Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation v. Board of Oil and Gas Conservation, 792 F.2d 782, 794, 9th Cir. 1986. BLM); (Nancy v. EPA, 645 F.2d 701, 710-711, 9th Cir. 1981. EPA); (Cheyenne-Arapahoe Tribes of Indians of Oklahoma v. United States, 512 F.2d 1390, 1395 n.8 Ct. Cl. 1975. Treasury and OMB).

The previous discussion refers to actions on Indian lands. Neither the Proposed Action nor the Agency Preferred Alternative crosses any Indian lands. However, the Animas Valley and the San Juan Valley route variations (Appendix B) do cross Indian reservations.

RELATIONSHIP TO NON-FEDERAL POLICIES, PLANS, AND PROGRAMS

Table 1-4 provides a summary of special use and utility permit requirements for the counties crossed by the Proposed Action.

SCOPING

Scoping Meetings

The scoping process for the TransColorado natural gas pipeline began in December 1989 when TransColorado filed an application and a proposed plan of development (POD) with the BLM Montrose District Office and the Forest Service, and the BLM/FS began their review of the project. The POD was later revised and re-submitted on March 15, 1991.

A notice of intent (NOI) to prepare an EIS on the project was published in the Federal Register on March 15, 1990. Following publication of the NOI, the BLM and FS held both interagency and public meetings. The interagency meetings were held in Montrose, Colorado, on June 12 and 13, 1990. Attending were representatives from all the affected BLM resource areas (White River, Grand Junction, Uncompahgre Basin, San Juan, and Farmington); Forest Service districts (Ouray, Norwood, Dolores, Mancos); other affected Federal agencies (Fish and Wildlife Service, Western Area Power Administration, Bureau of Reclamation (BuRec), Bureau of Indian Affairs, Army Corps of Engineers); Colorado state agencies (Division of Wildlife, Division of Parks); and the Southern Ute tribe. The results of the interagency meeting included a preliminary identification of issues to be treated in the draft EIS and some suggestions for route variations.

The major agency resource concerns included: use of existing corridors; implementation of adequate soil protection measures after disturbance; avoidance and/or stabilization of slopes affected by landslides; adequate protection of sensitive plant and animal species; adequacy of weed control measures; protection of wetlands;

TABLE 1-4

Transcolorado Gas Transmission Project
County Land Use Plans and Permit Requirements

Agency	Land Use or Master Plan		Specific Energy Development Policies	Specific Utility Corridor Policies	Zoning	Public Hearing	Bond	Permits or Requirements for Pipeline Construction
	Yes	No						
Colorado Counties								
Delta County	X		X	X		X	X	- Permit to develop in a designated area of state interest (if applicable). - Permit to construct a facility of a public utility. - Utility permit. - County road access permit.
Dolores County		X	X	X		X	X	- ROW permit. - County permit to install utility-type devices in county roadways. - Road-cut permit. - County road access permit.
Garfield County		X			X	X		- Special use permit. - Fiscal impact analysis. - Building permit. - Road use permit. - County road access permit.
La Plata County	X		X	X		X		- Class II development permit. - Building permit. - ROW permit. - County road access permit.
Mesa County	X		X	X	X	X		- Conditional use permit. - Road use permit. - Building permit. - County road access permit.

TABLE 1-4 (CONTINUED)

Agency	Land Use or Master Plan		Specific Energy Development Policies	Specific Utility Corridor Policies	Zoning	Public Hearing	Bond	Permits or Requirements for Pipeline Construction
	Yes	No						
Montezuma County	X			X		X		- Require pipeline companies to work with Board of County Commissioners in order to site pipeline facilities. - Permit to locate pipeline. - No utility siting permitted in the Summit Ridge Mancos Valley corridor (County Resolution 86-24).* - County road access permit.
Montrose County	X				X	X		- Development permit. - Road cut permit. - County road access permit.
Rio Blanco County	X		X	X	X	X		- Special use permit.
San Miguel County	X			X	X	X	X	- Special use permit. - Building permit. - County road access permit.
New Mexico Counties								
San Juan County		X						- Road cut permit, prefer not to share county ROW with pipeline.

Source: FERC Staff Data Request No. 31 - TransColorado Response November 12, 1990, T.R. Blackham.
Personal Telephone Communication: Linda Tompson, San Juan County, NM 1990; Roy Flack, San Juan County, NM 1990; Charlie Knox, San Miguel CO., NM 1990. Delta County, CO 1990; Dolores County, CO; Garfield County, CO 1979; La Plata County, CO 1990; Mesa County, CO 1988, 1990; Montezuma County, CO 1990; Montrose County, CO 1983, 1988; Rio Blanco County, CO 1983, 1990.

* The Montezuma County resolution reads: Whereas: Summit Ridge and the Mancos Valley are affected by the two electrical transmission lines and three pipelines for the transportation of hydrocarbons and carbon dioxide and;

Whereas: The rights-of-way for these public utilities fall predominately on the private land and;

Whereas: Local landowners have objected to any additional power lines or pipelines.

Now Therefore be it Resolved: That this corridor is closed and any additional power line or pipeline companies that wish to cross Montezuma County must choose an alternate route.

protection of streams; potential for conflicts with utilities (transmission lines, other pipelines); visual concerns on the Grand Mesa and at major river and road crossings; and the cumulative impact of the TransColorado pipeline in relation to past and proposed oil and gas projects in the region.

The major routing concerns included the need for a route variation on the side of the Grand Mesa that would reduce the potential visual impacts from a new ROW in a previously undisturbed area; the need for a route variation in the Ryman Creek area in Dolores County where landslide deposits and low rehabilitation potential soils are present; the need for an additional route variation to the segment of the proposed route between the town of Hesperus and the Ignacio natural gas treatment plant where extensive conflicts with residential areas, Southern Ute tribal lands, and the proposed Ridges Basin Reservoir (Animas-La Plata Project) were identified; the need to confine the width of the existing large pipeline corridor between the Ignacio Plant in La Plata County and the pipeline terminus at the Blanco Plant, near Bloomfield, New Mexico; and the need to identify additional route variations to reduce forestry impacts on portions of the San Juan National Forest north of Dolores.

Two series of public scoping meetings were conducted. The first meetings were conducted in Grand Junction on July 24; Montrose, July 25; Norwood, July 26; Ignacio, August 6; Durango, August 7; Mancos, August 8; and Dolores, August 9, 1990. Meeting participants were provided with a scoping document which summarized the purpose and need, location of the project, and the preliminary list of issues identified by the public agency scoping meeting participants. Detailed route maps were provided for public review. The public then provided oral and written comments on the pipeline proposal.

During the first public scoping meetings, the public expressed a variety of concerns over the proposed location of the pipeline. In Mesa County, numerous comments were received regarding potential visual effects of TransColorado's proposed route on the side of Grand Mesa, and objections from the city of Palisade concerning potential impacts on the Palisade municipal watershed. The city of Grand Junction expressed concerns about the crossings of their domestic water pipelines. Public concern in Montezuma and La Plata Counties focused on routes in the Mancos Valley, the Hesperus area, and the Wildcat Canyon area where the pipeline would cross private land already encumbered with several utility lines. In addition, the Southern Ute Tribe expressed concern over pipeline routing across tribal lands and the Department of the Interior's "Trust Responsibility" to the Tribe. Other frequent concerns included: the disproportionate use of private lands relative to available public lands, inadequate reclamation of previous pipeline projects, routing the pipeline in existing corridors containing multiple pipelines resulting in cumulative land use constraints to landowners, and the lack of alternatives to the proposed route from the vicinity of Hesperus to the gas delivery point at the Blanco gas processing plant near Bloomfield, New Mexico.

The second set of meetings was held in Mancos, Colorado, and Farmington, New Mexico on October 16 and 17, 1990, respectively. These meetings were held to solicit comments on three new route variations developed in response to comments received at the first series of meetings.

The Mancos Valley is an extremely sensitive area from the standpoint of the residents' perspective on the utility industry. There is widespread mistrust and concern because of past performance by other pipeline companies in land rehabilitation efforts. There is a strong positive feeling of private property rights and negative feelings toward the right of condemnation by the utility industry. In addition, the majority of Mancos Valley citizens who live along the corridor do not want their property crossed by any future pipelines or other utilities. In response to citizen concerns, the Montezuma County Commissioners passed a resolution in 1986 closing the Mancos Valley Corridor to future pipeline construction.

A summary of the comments received as part of the public scoping process is presented in Table 1-5. Comments were divided into six general groups:

- Natural Resources. These concerns related to management and maintenance of natural resources: soil, vegetation, wildlife, air quality, and water quality.

- Human Resources/Land Use. These concerns related to the relationships between

TABLE 1-5

TransColorado Gas Transmission Project
TransColorado Public Scoping[1]

Location	Participants	Comments[2]	Natural Resources	Human Resources/ Land Use	Routing	Purpose/ Need	EIS Process	Construction and Reclamation
Dolores	24	32	9 (28%)	17 (53%)	4 (13%)	1 (3%)		1 (3%)
Durango	47	56	19 (34%)	18 (32%)	15 (27%)		1 (2%)	3 (5%)
Grand Junction	60	119	42 (36%)	28 (23%)	35 (29%)	6 (5%)	2 (2%)	6 (5%)
Ignacio	17	38	12 (32%)	17 (45%)	6 (15%)	2 (5%)	1 (3%)	
Mancos	86	142	19 (13%)	55 (39%)	53 (37%)	4 (3%)	8 (6%)	3 (2%)
Montrose	28	76	16 (21%)	30 (39%)	15 (20%)	7 (9%)	8 (11%)	
Norwood	13	17	5 (29%)	6 (35%)	3 (18%)			3 (18%)
Farmington	18	10	3 (30%)	2 (20%)	4 (40%)	1 (10%)		
		490	125 (26%)	173 (35%)	135 (28%)	21 (4%)	20 (4%)	16 (3%)

[1]Summary from three meetings in July, four meetings in August, and two meetings in October.

[2]Includes both verbal comments at the meeting and written comments received later.

the pipeline construction and operation requirements and existing land uses, compensation for land damages, changes in landscape visual character, noise, effects on archaeological and historical resources, and transportation requirements.

- Routing. These concerns related to expressed preferences for one route variation over another, and suggestions for alternate variations.

- Purpose and Need. These concerns related to TransColorado's stated purpose and need for the project.

- Draft EIS process. These concerns related to the responsibilities of Federal, state, and local agencies for reviewing and selecting a Preferred Alternative for the pipeline.

- Construction and Reclamation. These concerns related to the procedures used to construct the pipeline and reclaim the ROW on private and public lands.

As can be seen in Table 1-5, the predominant concerns from all the public meetings centered on land use concerns, and comments and recommendations on the suitability of the TransColorado proposed route and route variations.

Issues

Issues Addressed in this Draft EIS

Through scoping, it was determined that 30 resources or resource activities had the potential to be affected by construction, operation, and maintenance of the TransColorado pipeline. The impacts on these resources were determined to be issues that would be addressed in this draft EIS. Of these resources, it was subsequently determined that 22 would be affected and 8 would not be affected by the TransColorado pipeline project.

Following is a listing of resources that would be affected by the TransColorado pipeline. Impacts to these resources are analyzed in detail in Chapter 4 of this draft EIS.

- Impacts to Air Quality
- Impacts to Topography
- Impacts to Leasable Minerals
- Impacts to Mineral Materials
- Impacts to Surface Water Quality and Quantity
- Impacts to Municipal Water Supplies
- Impacts to Wetlands
- Impacts to Soils
- Impacts to Prime Farmland and Farmland of Statewide Importance
- Impacts to Forestry
- Impacts to Livestock Grazing
- Impacts to Wildlife
- Impacts to Fisheries
- Impacts to Threatened and Endangered Species
- Impacts to Cultural Resources
- Impacts to Native American Religious Concerns
- Impacts to Visual Resources
- Impacts to Areas of Critical Environmental Concern
- Impacts to Transportation
- Impacts to Solid Waste Facilities
- Impacts to the Socioeconomic Conditions
- Impacts to Public Safety

Issues Considered but Eliminated from Detailed Analysis

Impacts to Geology

No unique or unusual geologic features designated for protection by Federal and state agencies would be crossed by the proposed route, agency preferred routes, or route variations. The TransColorado proposed and agency preferred route would cross a portion of a geologic feature called Rico Dome and Dolores River Valley that was included in a National Park Service inventory of areas that could potentially be designated national natural landmarks. The Rico Dome, an intrusive igneous mass, and the associated Dolores River valley occupy an area approximately 40 miles long by 1 to 5 miles wide. The National Park Service has no current plans to designate this feature as a natural landmark, and no regulations, or requirements for mitigation of surface disturbance within these undesignated areas (Salazar 1991). Because of the relatively small surface disturbance resulting from pipeline installation across the Dolores Valley and lack of specific national natural landmark designation

plans by the National Park Service, impacts to geology are not issues for this draft EIS.

Impacts to Floodplains

Under floodplain management guideline for implementing Executive Order 11988, all Federal agencies are required "... to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development when ever there is a practicable alternative..." Further, "if the base floodplain cannot be avoided adjust to it in order to: 1) reduce the hazard and the risk of flood loss; 2) minimize the impact of floods on human safety health and welfare; and 3) restore and preserve the natural and beneficial floodplain values."

The proposed route and the agency preferred route for the TransColorado Pipeline would each cross five major rivers (Colorado, Gunnison, San Miguel, Dolores, and Animas). Five major streams (Piceance Creek, Roan Creek, Plateau Creek, West Mancos River, Middle Mancos River) would be crossed by the proposed route and four (Piceance Creek, Roan Creek, Plateau Creek, West Mancos River) by the Agency Preferred. Appendix C, Tables C-1 and C-2 list the rivers, streams, and wetlands that would be crossed by the proposed route and agency referred route. The proposed TransColorado Pipeline would not modify or alter these floodplains because TransColorado has committed to environmental protection measures such as: crossing all streams perpendicular to the channel, locating major staging areas outside of the 100-year floodplain, burying the pipeline below the maximum estimated scour depth of a 100-year flood, and locating no aboveground facilities within 100-year floodplains (see Chapter 2, Environmental Protection Measures Section). Based on these commitments, impacts to floodplains are not Issues for this draft EIS.

Impacts to Paleontologic Resources

Environmental protection measures and stipulations have been included in this draft EIS that require the inventory, monitoring, and recording of significant fossil resources that are discovered during pipeline construction. Because these measures will ensure that scientific information is recovered, impacts to paleontologic resources are not issues for this draft EIS.

Impacts to Locatable Minerals

Under Federal mining laws, existing locatable mineral development rights take precedence over surface rights on Federal lands. As a consequence, proposed development of existing mining claims for locatable minerals would require pipeline relocation. And, by the same token, construction of the pipeline would not preclude the development of locatable minerals (e.g., precious metals).

Impacts to Groundwater

Environmental protection measures and stipulations have been included in this draft EIS that require the inventory, protection, and damage compensation for groundwater supply sources (wells and springs). Surface water relationships to groundwater supplies have been addressed under the topic of Municipal Water Supplies. Based on these commitments and project characteristics, impacts to groundwater are not issues for this draft EIS.

Impacts to Wild Horses

Construction of the pipeline would decrease forage from less than 1 percent of the available Spring Creek Basin wild horse range in San Miguel and Dolores Counties for the short term (1 to 3 years). TransColorado has committed to provide cuts across open trench sections to insure freedom of wild horse movement. No impacts to wild horse populations are expected, and, therefore, impacts to wild horses are not issues for this draft EIS.

Impacts to Wilderness

No designated wilderness or wilderness study areas (WSA) would be crossed by the Proposed Action, Agency Preferred Alternative, or any of the route variations. The Proposed Action would pass within 0.5 mile of the McKenna Peak Wilderness Study Area (recommended as nonsuitable for wilderness) in Dolores County (Figure 3-9 located at the end of Chapter 3); however, this pipeline segment would parallel an existing road and would not contribute a new human disturbance element to the landscape.

The Proposed Action is also adjacent to the Roubideau Canyon area, which has been proposed for wilderness status through legislation submitted by Congressman Campbell. The pipeline would closely parallel Transfer Road in this area and would not impact the wilderness proposal unless the proposed wilderness boundary is changed to include the road area, which is not likely.

Impacts to Recreation

No developed recreational facilities would be crossed by the Proposed Action, Agency Preferred Alternative, or any of the route variations. An environmental protection measure has been incorporated into the project that requires TransColorado to provide continual access to BLM and National Forest campgrounds and roads used for dispersed recreation. The visual impact of recreationists observing a new corridor in dispersed recreation areas is analyzed in the visual resources section.

Issues Outside the Scope of this Draft EIS

Certain issues raised during the public scoping were considered by the BLM to be not significant or not appropriate for this draft EIS. As a consequence, these issues were not carried through impact analysis in the draft EIS. The Council on Environmental Quality (CEQ) regulations direct the lead agency to review and eliminate from detailed study those issues that are not significant. The following impact topics and issues have been eliminated for the reasons noted:

Cumulative Effects of Coal Bed Methane Development

A number of comments were received concerning the need to analyze the effects of Colorado and New Mexico coal bed methane development since initiation of the Federal program in 1980. The permitting process for coal bed methane production is being conducted independently by the responsible Federal agencies. The TransColorado Gas Supply Plan based on a survey of suppliers indicates that sufficient gas is available from both conventional and existing coal bed methane wells to supply the pipeline without requiring immediate drilling. Such an analysis is outside the scope of this draft EIS.

Fairness of Eminent Domain

A number of comments concerned the need to analyze the fairness of the eminent domain laws with regard to their application for condemnation of private lands for utility purposes. Such an analysis is outside the scope of an EIS.

Easement Acquisition Process

A number of comments concerned the need to analyze the easement acquisition process on private lands and the basis for compensation between the pipeline company and the private landowner. Such an analysis is outside the scope of this draft EIS. The draft EIS addresses issues concerning land use constraints on private lands resulting from installation of pipelines and describes procedures and conditions for maintaining environmental quality on both public and private lands.

ROUTE SELECTION PROCESS

Prior to scoping, TransColorado developed a number of alternatives based on available information, such as project objectives, gas receipt and delivery points, environmental considerations, existing land uses, locations of existing utility corridors, and consideration of engineering design, construction, and operational constraints (TransColorado 1990). During the public scoping process, several route variations were developed. In response to public concerns, tribal opposition, and Montezuma County's position of opposing pipelines in the existing corridors, the BLM instructed TransColorado to investigate the constructibility of three new route variations between the Mancos Valley in Montezuma County and the pipeline terminus at the Blanco Plant near Bloomfield, New Mexico. TransColorado also defined a route variation to a portion of the Grand Mesa segment to reduce potential visual effects. Another route variation was developed to avoid landslide areas and unstable soils in the Ryman Creek area. Environmental concerns about the proposed route between Hesperus and Bloomfield led to the

development of two route variations in response to these concerns.

In response to public scoping, TransColorado notified the BLM that several route variations had been incorporated into the proposed route.

An interdisciplinary BLM/FS team evaluated the route variations proposed by TransColorado and those developed through scoping to determine whether these route variations offered any advantages over the TransColorado proposed route. A number of these route variations were found to: (1) lack sufficient benefits relative to the proposed route to warrant analysis; (2) result in unacceptable environmental impacts; and (3) not be constructible. These route variations were eliminated from further analysis. The reasons for their elimination are available from the BLM upon request. The documentation is contained in BLM Case File C - 51280 In the Montrose District Office.

CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

This chapter describes the Proposed Action and alternatives to the Proposed Action. The alternatives are (1) the Agency Preferred Alternative and (2) the No Action Alternative. The primary difference between the Proposed Action and Agency Preferred Alternative are the routes. The routes differ in the Norwood area and in the Mancos Valley area. A detailed comparison of the route differences in the Norwood area and Mancos Valley is presented in the Route Differences--Proposed Action and Agency Preferred Alternative Section of this chapter.

Although the pipeline routes under the Proposed Action and Agency Preferred Alternative have been identified in this draft EIS, several route variations are still being considered. These variations would replace portions of the routes proposed by TransColorado and the Federal agencies. These variations, termed route variations, are described and analyzed in Appendix B.

PROPOSED ACTION

Under the Proposed Action, the TransColorado Gas Transmission Company (TransColorado) would construct, operate, and maintain a 22- and 24-inch diameter natural gas transmission pipeline system between the Piceance Basin southwest of Meeker, Colorado, and a large, existing gas processing facility called the Blanco Plant near Bloomfield, New Mexico. The pipeline route proposed by TransColorado is shown on Figure 2-1. The proposed pipeline route would be 302 miles long and would require construction of approximately 3 miles of interconnecting pipeline. The maximum design flow rate for the project would be 300 MMcfd of natural gas, based on a maximum allowable operating pressure of 1,287 pounds per square inch gauge (psig) for the approximately 260 miles of 22-inch pipe segment and 1,310 psig for the approximately 42 miles of 24-inch pipe segment.

A maximum of 2,802 acres would be disturbed during construction (including ROW, six new compressor station sites, and six meter station sites). This disturbance includes lands previously disturbed by other projects as well as previously undisturbed lands. Table 2-1 lists miles of land under private, state, and Federal ownership that would be crossed. A total of 52 percent of the required ROW would be located on Federal lands, 5 percent on state lands, and 43 percent on private lands.

Design and construction standards would be in conformance with the requirements of all applicable Federal, state, and local laws, rules, and regulations and would be in specific compliance with industry standards.

Construction

Pre-construction

Pre-construction activities include ROW procurement, various permit acquisitions, final alignment, final design, coordination with affected utilities, surveying, and staking. A pre-construction conference would be held to discuss scheduling, procedures, stipulations, and expectations of all parties involved in the project. ROW grants on Federal lands would be obtained from the appropriate agencies after the appropriate environmental analyses are completed and a record of decision (ROD) has been filed. Right-of-way (ROW) grants may include both general guidelines and site-specific construction stipulations. Easements, grants, or permits also must be obtained from the individual state and county agencies involved.

Acquisition of easements on private land requires negotiations with the landowner(s) and any and all owners of interest. Typical easement negotiations result in the proponent and the

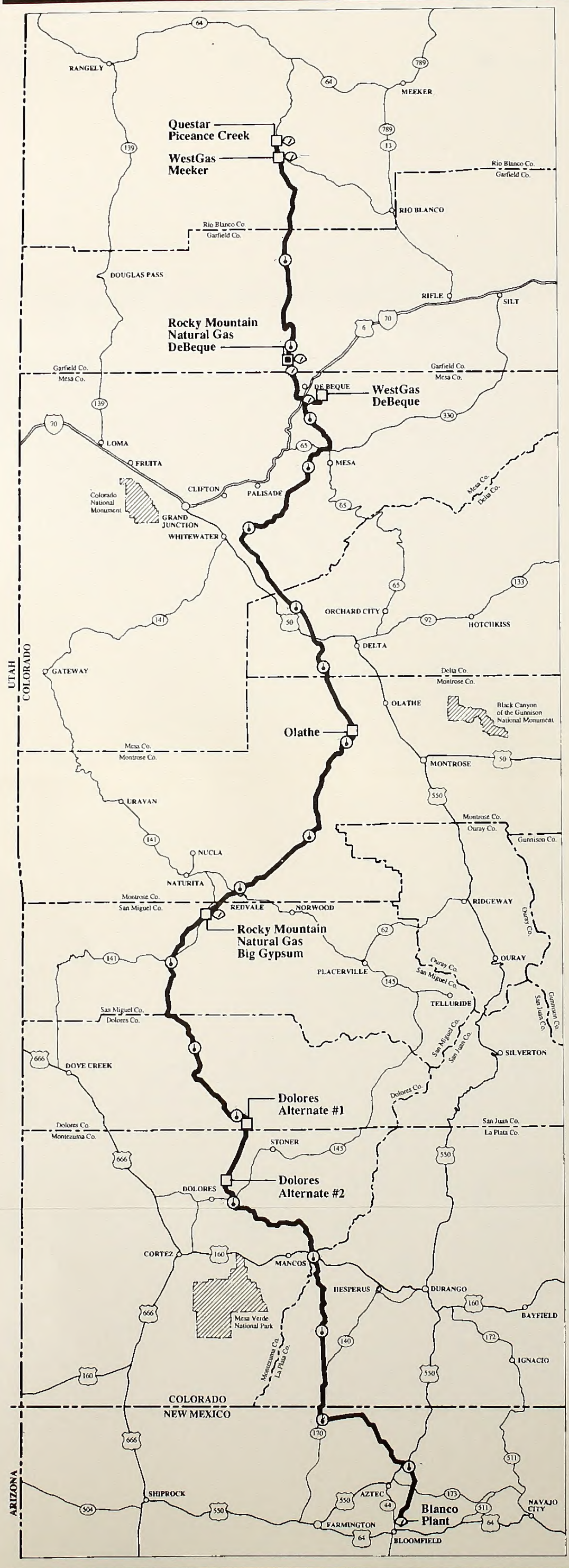
TABLE 2-1

TransColorado Gas Transmission Project
Land Ownership and Parallel Facilities
Proposed Action

Item	Units
Length (miles)	302
Disturbance (total acres)	2,802
Ownership (percent)	
Private	43
BLM	34
Forest Service	18
State	5
Residences within 500 feet of ROW	42
Parallel Facilities	
Total Miles	180
Percent	60
Road Improvements (miles)	199
Existing Compressor Stations	1
Proposed Compressor Stations	6
Proposed Meter Stations	6
Proposed Block Valves	19

PROPOSED ACTION

FIGURE 2-1



North 0 4 8 16 miles

Existing Compressor Station, Pipeline Interconnection and Meter Station

Proposed Compressor Station, Pipeline Interconnection and Meter Station

Proposed Compressor Station

Proposed Meter Station and Pipeline Interconnection

Proposed Block Valve

TRANSCOLORADO GAS TRANSMISSION PROJECT

landowner reaching an agreement whereby the proponent secures access rights for surveying, clearing, grading, pipeline construction, restoration activities, and for the continuing maintenance of the facilities. The proponent also secures surface development rights to access easement and maintain the pipeline.

Pipeline Construction

TransColorado has requested a 75-foot-wide construction ROW of which 50 feet would be maintained as the operational ROW. Construction in some areas, such as river or stream crossings, highway crossings, and steep slopes, may require ROW in excess of the 75 feet. In these cases, permits from Federal agencies or authorization from private landowners would be obtained prior to construction.

The route would parallel other pipelines and utilities for approximately 180 miles or 60 percent of the route. Table 2-1 indicates miles of pipeline parallel to other facilities. TransColorado would maintain an offset of between 25 and 50 feet from existing pipelines and power lines. In some cases, it would be feasible to locate the route in such a manner as to share ROW with existing facilities. In this case, new disturbance caused by the proposed pipeline would be minimized. The extent to which such construction and subsequent sharing of linear ROW or existing corridors can occur would be based on the exact location of existing facilities in the ROW, the width of existing ROW, and how these factors relate to desired offsets and agreements with utility operators. Quantification of actual shared ROW would only be possible when final staking of the ROW occurs.

The general pipeline construction phases that are common to all pipelines are: clearing, grading, excavation, stringing, bending, welding, coating, lowering, backfilling, hydrostatic testing, cleanup, restoration, testing, and commissioning (see Figure 2-2).

The proposed pipeline construction techniques are similar to those of standard pipeline construction methods and would be in conformance with all applicable DOT regulations and FERC guidelines.

Clearing and Grading

The vegetation on the 75-foot ROW would be removed only where absolutely necessary to allow access and construction of the pipeline. Clearing of the ROW would be kept to the absolute minimum and still allow adequate room for the construction equipment to operate safely. Trees would be cleared only when necessary and not in a straight line. All brush and trees may be windrowed along the ROW so they could be dispersed back over the ROW to aid in the revegetation and also to impede unauthorized traffic. Sidehill cuts would be kept to the minimum. Where the pipe would traverse a steep side hill, a bench cut would be made to allow for safe operation and to reduce the amount of soil exposed during the construction process. Erosion control features include mulches, matting, temporary seedings, buffer zones, sediment barriers, water bars, sediment basins, and ditchline breakers (trench plugs). No construction activities would be allowed during wet conditions when equipment creates greater than 4-inch ruts.

Storage areas would be on commercially rented areas in cities along the route. Temporary staging areas would be located along the ROW and would probably be 100 feet x 100 feet. The exact locations would be determined during the final survey.

Trenching

A trench would be dug using trenching machines, rocksaws, backhoes, and blasting (only where necessary) to a depth of at least 60 inches and 32 to 40 inches wide. The depth of the trench would be increased in all potential floodplain areas to insure that the pipeline would be below the maximum estimated scour depth of a 100-year flood.

Hydrostatic Testing

Hydrostatic testing would involve withdrawing water from local streams or rivers and testing the pipeline, under pressure, for its integrity. Water would be withdrawn from approved locations, but would not be a significant portion (< 5 percent) of the total flow. Once the testing is completed, the water would be discharged in approved locations in such a manner as to not cause increased

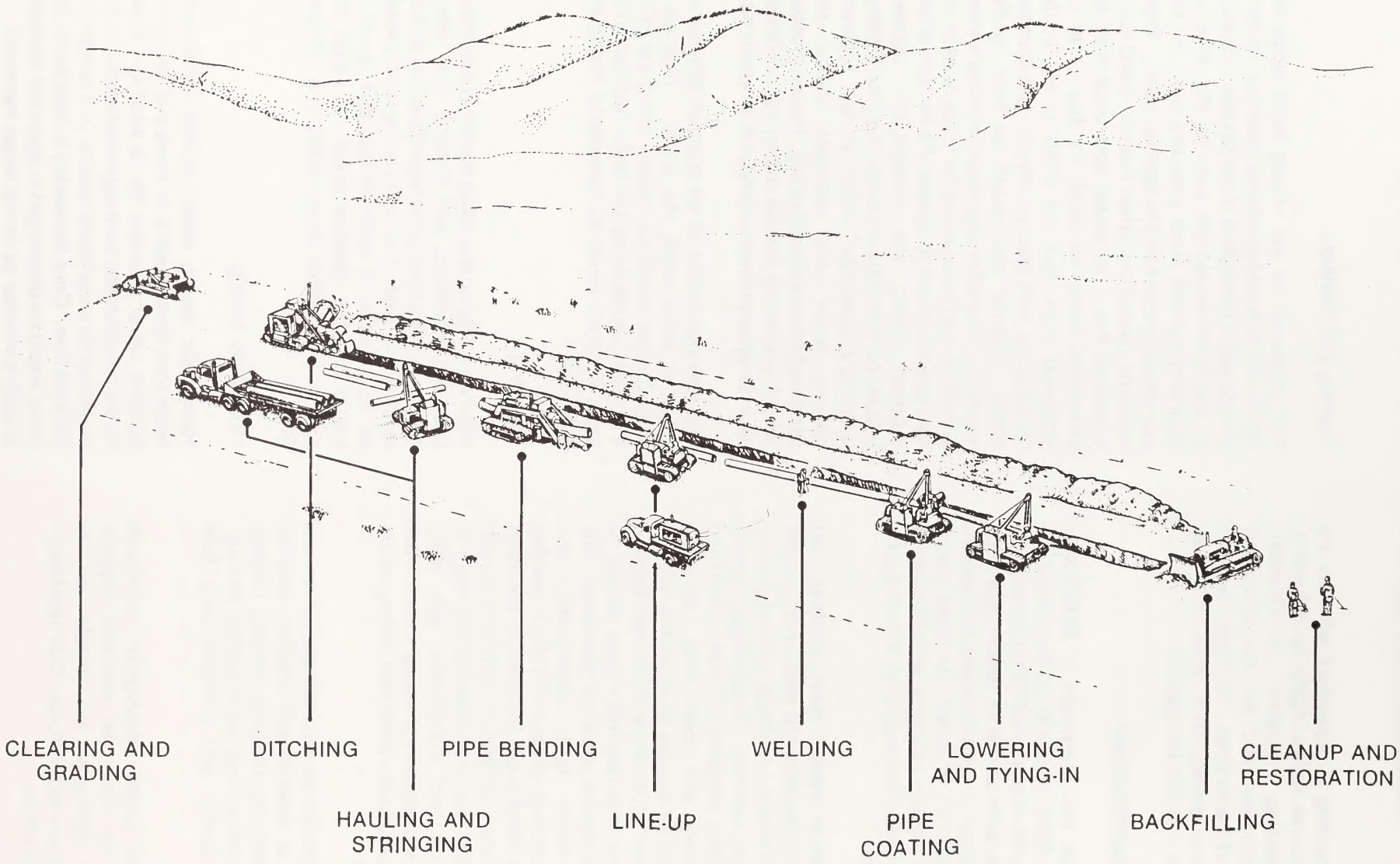


Figure 2-2. TransColorado Gas Transmission Project Typical Construction Spread

erosion or pollution of the rivers or streams. Consultation with the appropriate agencies would be conducted and any required permits would be obtained prior to actual testing. Testing would be performed in accordance with 40 CFR Part 192 Subpart J, to ensure pipeline integrity. A detailed description of the process is contained in TransColorado's plan of development (POD) and the Environmental Protection Measures section in this chapter. The entire system would be tested according to U.S. Department of Transportation guidelines. Table 2-2 lists sources for hydrostatic testing.

Cleanup and Restoration

The ROW would be graded back to original contour, erosion control devices would be installed, and revegetation would be completed as described in the Environmental Protection Measures section in this chapter and in Appendix D, Revegetation Species. All waste materials either would be stored or disposed of at an appropriate waste disposal site in accordance with applicable regulations. An estimated 4,300 cubic yards of solid waste would be generated. No hazardous wastes would be used or produced during construction.

Special Areas Construction

Slopes

Unstable slopes and fault crossings would be studied to identify the exact location for the pipe. Five active landslide areas would be crossed. There are two locations on the Grand Mesa National Forest, one location in the Ryman Creek-Divide area, one location near Chicken Creek, and one location near the West Mancos River. Chapter 3, Table 3-2, gives a more detailed listing of these landslide areas. Other considerations would be the wall thickness of the pipe, pipe realignment, shut-off valves, and density of the backfill to allow for slight movement of the pipe. On steep slopes, bench cuts would be made and extra erosion control devices would be installed. Each site would be individually designed once the actual route is designated on the ground. The erosion control features mentioned under Clearing and Grading would also be employed in the crossing of unstable slopes. Each site would be individually designed for the best results. Pipeline construction on the Gilman Gulch (MP 32) section, which has extremely steep slopes and rock outcrops, would be aboveground on anchored supports. A staging area is anticipated for each end of the section. A staging area 300 feet x 300 feet would be located at the top of the hill, and a 200 feet x 200 feet area would be located at the bottom of the hill. Results of these studies may be available in the final EIS.

Roads and Railroad Crossings

Crossings of railroads, interstate highways, state highways, and paved roads would be done by boring. This method would require additional work space on either side of the bore for work space and storage of soil. Crossing of unsurfaced, lightly travelled roads would be completed by the open-cut method or as required by the authorized agency. The crossing would generally be completed in 1 day. Provisions for a detour would be provided as needed. Two rail crossings, 4 Federal highway crossings, 7 state highway crossings, and 44 improved roadway crossings would be made.

Irrigation Canal Crossings

Crossing of canals would be done by open trench method or boring or as required by the authorized agency. The crossing would be scheduled when the canal is empty, if at all possible. A total of 21 irrigation canals would be crossed. Chapter 3 lists the Bureau of Reclamation canals that would be crossed.

Buried and Overhead Utility Crossings

Buried and overhead utility crossings would be done in consultation with the affected utility. Machine excavation would not be allowed within 5 feet of the buried utility unless otherwise specified by the affected utility. Specific construction requirements would be negotiated between TransColorado and the affected utility company prior to construction. Ten major power transmission lines and five major pipeline crossings would be made.

River and Stream Crossings

Preliminary indication from the Corps of Engineers is that all of the rivers and streams to be crossed

TABLE 2-2

TransColorado Gas Transmission Project
Potential Sources of Hydrostatic Test Water
Proposed Action and Agency Preferred Alternative

Stream	Average Flows CFS	Maximum Withdraw for Hydrostatic Testing Assuming Average Flows[1] CFS	GPM
Piceance Creek	32	1.6	718
Roan Creek	44	2.2	987
Colorado River	3,945	3.4	1,500
Plateau Creek	180	3.4	1,500
Kannah Creek	31	1.5	673
Gunnison River	2,439	3.4	1,500
Roubideau Creek	120	3.4	1,500
San Miguel River	249	3.4	1,500
Disappointment Creek	18	0.9	404
La Plata River	37	1.8	808
Animas River	926	3.4	1,500
Dolores River	440	3.4	1,500

Source: TransColorado 1991;
Murphy 1991

[1]Assuming a maximum withdraw rate of 5 percent with no more than 1,500 gpm (3.4 CFS) withdraw rate from any source.

by the Proposed Action would be permitted under the Nationwide Permit System. Therefore, individual Section 404 permits would not be required. As shown on Table 2-3, 5 major rivers, 5 major streams, and 17 minor streams would be crossed in Colorado. The Dolores River, Chicken Creek, West, Middle, and East Mancos Rivers crossed in Colorado have been designated by the state as high quality Class 2 streams. One major river would be crossed in New Mexico (Table 2-3). A total of 15 cold water fisheries streams would be crossed.

Sediment quality at the proposed crossings of the Dolores and San Miguel Rivers is unknown. Prior to any construction, TransColorado would develop and implement an approved sampling methodology to determine the quality and potential for re-suspension of any contaminated sediments at the crossings. If contaminated sediments are found, TransColorado would develop and implement a site-specific mitigation or remediation plan to control the re-suspension of any contaminated sediment.

Stream and river crossings would be made as close to perpendicular as possible. Construction would take place during low flow conditions. The pipeline would be buried below the maximum estimated scour depth of a 100-year flood in all potential floodplain areas. Blasting would only be done after consultation with the proper authorities. Vegetation along the banks would be preserved as much as possible. Water bars would be constructed wherever necessary to prevent increased erosion. Flume pipe culverts may be used to allow uninterrupted flow in important fisheries. Mudboards (mats) would be used where necessary to give support to the construction vehicles. Backfill would be performed to minimize the agitation of the fill, which would increase erosion. Rock waterways may be constructed where intermittent streams are subject to high-intensity runoff. Excavated materials would be stockpiled at least 10 feet from the bank on streams less than 10 feet wide. Major crossings would be done by the open-cut trenching method with tracked backhoes. The pipe would be lowered into the trench and backfilled as quickly as possible. Staging areas would be at least 50 feet from the stream bank (100 feet on USFS) to minimize impacts resulting from construction and to avoid accidental spills. Restoration will include, but is not limited to, establishment of pre-construction contours, bank stabilization, staging area restoration, and revegetation of all disturbed areas. Abandoned diversions would be plugged to avoid trapping fish. Consultation with appropriate agencies would aid in developing site-specific plans for important fisheries. Results of consultation will be placed in the final EIS.

Wetland Crossings

When crossing wetlands, the most direct route would be taken to reduce the disturbance. The pipeline would be buried below the maximum estimated scour depth of a 100-year flood in all potential floodplain areas. The width of the cleared ROW would be kept to the absolute minimum. Equipment pads and wide-track, or balloon-tire, construction equipment would be used to reduce the amount of disturbance. The entry of the construction equipment into the wetlands would be kept to an absolute minimum.

Natural Resource Requirements

Natural resources that would be encountered or crossed by the Proposed Action are shown in Table 2-4. A more detailed description of these resources is presented in Chapter 3, Affected Environment. Natural resources such as water and minerals would be needed for construction and testing of the pipeline. These resource requirements are described below.

Water would be withdrawn from streams crossed by the pipeline for hydrostatic (pressure) testing of the pipeline. Water would be withdrawn at a rate not to exceed 1,200 to 1,500 gpm (gallons per minute). Table 2-2 lists potential water sources along the TransColorado proposed route. TransColorado has proposed that total appropriations from any one source would not exceed 2 million gallons. The amount of water withdrawn from any one source will be less than 5 percent of the total flow. It is anticipated that pipeline segments would be tested in a sequential order and, therefore, water would be transferred from segment to segment.

Water would be used to control fugitive dust at construction sites. Water tankers would obtain water from sources listed in Table 2-2. Water requirements would be dependent on construction site soil conditions, location, and

TABLE 2-3

TransColorado Gas Transmission Project
Perennial Water Crossings - Proposed Action

Approximate Milepost	Perennial Water Crossing	Approximate Width Traversed (feet)	Size of Crossing	High Water Quality Streams[1]	Cold Water Fisheries[2]
2.6	Piceance Creek	25	major stream		x
8.6	Willow Creek	5	minor stream		x
25.3	Crystal Creek	140	minor stream		
36.3	Conn Creek	30	minor stream		
44.3	Roan Creek	50	major stream		
47.4	Colorado River	375	major river		
59.4	Plateau Creek	70	major stream		x
105.4	Gunnison River	250	major river		x
105.6	Roubideau Creek	25	minor stream		
110.5	Roubideau Creek	25	minor stream		
143.5	Sheep Creek	15	minor stream		x
151.1	San Miguel River	80	major river		x
155.4	Maverick Draw	20	minor stream		x
157.2	Naturita Creek	40	minor stream		x
201.8	Plateau Creek	20	minor stream		x
222.6	Dolores River	100	major river	x	x
227.0	Lost Canyon Creek	30	minor stream		
234.8	Chicken Creek	30	minor stream	x	x

TABLE 2-3 (CONTINUED)

Approximate Milepost	Perennial Water Crossing	Approximate Width Traversed (feet)	Size of Crossing	High Water Quality Streams[1]	Cold Water Fisheries[2]
237.4	West Mancos River	50	major stream	x	x
240.6	Middle Mancos River	30	major stream	x	x
243.0	East Mancos River	50	minor stream	x	x
262.2	La Plata River	30	minor stream		
267.0	La Plata River	30	minor stream		
268.1	La Plata River	30	minor stream		
272.1	La Plata River	30	minor stream		
272.5	La Plata River	30	minor stream		
290.1	Animas River	150	major river	[3]	x

[1] High Water Quality Streams. Colorado: These streams are included in the High Quality Class II designation. These waters shall be maintained and protected at this existing quality unless lower quality is allowed by the state to accommodate important economic or social development.

[2] Cold Water Fisheries. Colorado: These are waters that 1) currently are capable of sustaining a wide variety of coldwater biota, including sensitive species; 2) could sustain such biota for correctable water quality conditions.

[3] The Animas River in New Mexico has been designated as suitable for irrigation, municipal supply, industrial supply, livestock watering, wildlife watering, marginal coldwater fishery, warm water fishery, and secondary contact recreation.

TABLE 2-4

TransColorado Gas Transmission Project
Occurrence of Natural Resources
Proposed Action

Natural Resource Crossings	Units
Paleontological Formations (miles)	17
Oil & Gas Fields (miles)	35
Strippable Coal Fields (miles)	6
Oil Shale (<25 gallons/ton) Formations (miles)	0
Oil Shale (> 25 gallons/ton) Formations (miles)	37
Major Rivers Crossed (number)	5
Major Streams Crossed (number)	5
Minor Streams Crossed (number)	17
Wet Meadow/Hayland (miles)	1.4
Wet Shrublands (miles)	0.2
Forest Wetland (miles)	1.5
Saline/Alkaline Soils (miles)	58
Rocky/Shallow/Wetland Soils (miles)	120
Steep Ascent/Descent Slopes (>15% <40%) (miles)	25
Steep Ascent/Descent Slopes (>40%) (miles)	12
Steep Side Slopes (≥40%) (miles)	0.4
Active Landslide Areas (miles)	4
Landslide Deposits (miles)	17
Incised Channels (miles)	66
Potentially Active Faults	3
Prime Farmlands (miles)	9
Farmlands of Statewide Importance (miles)	12
Agricultural Lands - All categories (miles)	30
Rangeland (miles)	173
Timber Lands (miles)	29
Pinyon-Juniper (miles)	70
Livestock Allotments (AUMs)	238
Key Deer Range (miles)	121
Key Elk Range (miles)	113
Key Grouse Range (miles)	28
Key Antelope Range (miles)	2

TABLE 2-4 (Continued)

Natural Resource Crossings	Units
Active Raptor nests within 1.0 mile (number)	3
Bald Eagle Winter Range (miles)	77
Black-Footed Ferret (miles)	60
T/E Plant Habitat (miles)	64
Cultural Resources: Projected sites within 75-foot ROW	199
Cultural Resources: High sensitivity areas (miles)	201
Cultural Resources: Medium sensitivity areas (miles)	58
Visual Contrasts - High (miles)	36
Visual Contrasts - Moderate (miles)	51

seasonal conditions. The same constraints would apply to this use as those that apply to hydrostatic testing.

Mineral resources, such as sand and gravel, would be needed for trench padding, gravel surfacing, and for roadway maintenance and repair. TransColorado has estimated that 7,500 cubic yards of imported trench padding material, 2,700 cubic yards of gravel surfacing, and a minimal amount of roadway gravel base would be used during construction. For purposes of comparison, it is assumed that approximately 25 cubic yards of trench padding material would be needed for each pipeline mile (7,500 ÷ 302).

Typically, trench padding material is produced on-site by separating excavated material. However, in rocky areas imported material would be required. Site-specific studies may indicate imported materials will be needed for construction of compressor station or meter station facilities. TransColorado would also apply surface gravel to these sites. Gravel for roadway repair and maintenance would be applied, if required by Federal, state, or county road departments or other jurisdictional agencies.

Imported mineral materials would be acquired from commercial gravel pits located in the project vicinity. Commercial gravel pits have been identified in Rio Blanco, Garfield, Mesa, Delta, Montezuma, Montrose, La Plata, Archuleta, and San Juan Counties. Borrow pits located on private or agency land may provide some imported materials. Permits or authorizations would be obtained as needed to use imported materials.

Facilities Construction

Project facilities needed to support the pipeline include compressor stations, metering stations, block valves, pigging (cleaning) facilities, cathodic stations,and communication systems. Figure 2-1 shows locations of the facilities that would be needed to support the pipeline. Following is a description of the facilities. Table 2-5 shows pipeline system components and design.

Approximately 314 miles of line pipe, six meter run assemblies, pig launcher/receiver assemblies, block valve assemblies, and seven compressor units would be shipped into the region via railroad and commercial carrier. Line pipe would be transported on the Rio Grande - Southern Pacific Railroad to commercial storage yards in Rifle, Grand Junction, and Delta/Olathe, Colorado and by the Santa Fe Railway to Gallup, New Mexico. Heavy equipment would be transported by rail or roadways to commercial storage areas or directly to the pipeline ROW. A portion of the construction equipment would be rented locally.

Compressor Station

Six new compressor stations would be constructed. The locations for five of the new compressor stations are known at this time. These compressors have been named Questar-Piceance Creek, WestGas-Meeker, WestGas-Debeque, TransColorado-Olathe, and Rocky Mountain-Big Gypsum. The location of the sixth compressor is undecided at this time. Two sites are being considered for the sixth station in the Mancos Valley near Mesa Verde National Park -- Dolores Alternate 1 or Dolores Alternate 2.

Dolores Alternate 1 is 21 miles from the nearest Park boundary, and Dolores Alternate 2 is approximately 11 miles northwest of the park boundary. An existing Rocky Mountain Natural Gas compressor located near DeBeque (Rocky mountain-DeBeque) would be expanded, for a total of seven compressor sites. The names and locations of these compressor sites are shown on Figure 2-1.

The compressor sites would increase the pressure in the pipeline to allow gas to be transported. The compressors would be fueled by natural gas and would be housed in metal buildings with other processing equipment. The total land requirement for each compressor would be 5 acres maximum. Each site would be fenced and the surface would be graveled.

Table 2-6 shows the types of compressors that would be constructed and the estimated pollutants that would be emitted at each station.

Design and construction of the compressor stations and facilities would be in conformance with DOT regulations and FERC guidelines. Stations would be designed to limit operational noise to 55 dBA at the nearest occupied residence. All local permits would be obtained and local agencies would be contacted to

TABLE 2-5

TransColorado Natural Gas Transmission Project
Pipeline System Components and Design
Proposed Action

Component	Units or Length	Land Requirements Construction/Operation	Design
Pipeline	302 miles 3 miles	75-ft. ROW/50-ft. ROW 75-ft. ROW/50-ft. ROW	260 miles of 22-inch and 42 miles of 24-inch-diameter pipe 8-inch diameter interconnect pipe
Compressor Stations	7	5-acre site (maximum, each site)	Buried and aboveground pipe, turbine compressors, gas coolers, control building, block valve assembly, pigging (cleaning) apparatus
Electric Service Line	2.5 miles	Olathe Compressor Station	Standard
Electric Service Line	3 miles	Dolores Alternative 2	Standard - 300 yards new ROW
Meter Stations	6	0.25-acre site	Orifice plate, turbine meter, gas quality measuring equipment, piping and valves
Block Valves	19	Contained within other sites or pipeline ROW	Sectionalizing valves installed at 20-mile intervals
Pigging Facilities (cleaning)		Installed with compressor stations, meter stations, and block valves	Facilities include traps and launchers
Cathodic Stations		Installed with compressor stations or within ROW	Facilities include power source, ground beds, rectifiers, and test leads
Communication System		Constructed at proposed compressor stations or existing sites operated by project partners	Towers, antennas, ancillary facilities

Source: TransColorado POD 1991.

TABLE 2-6

TransColorado Gas Transmission Project
Description of Compressor Stations and Estimates of Pollutants - Proposed Action

Compressor Name and Location	Compressor Type and Horsepower	Estimated Emissions[1]		
		Nitrogen Oxides	Carbon Monoxide	Hydrocarbons
Questar-Piceance[2] MP 0	Centrifugal - 12,390 hp	174.00 (5.01)	15.60 (0.45)	8.10 (0.23)
WestGas-Meeker[3] MP 2.7	Reciprocating - 2,700 hp	57.00 (1.64)	83.00 (2.39)	54.00 (1.55)[4]
Rocky Mtn.-DeBeque, MP 41.0	Reciprocating - 2,400 hp	254.91 (7.33)	32.44 (0.93)	101.96 (2.93)
West-Gas-De Beque, MP 48.5	Reciprocating - 5,100 hp	119.00 (3.42)	193.00 (5.55)	23.00 (0.66)[4]
TransColorado-Olathe MP 121.6	Centrifugal - 4,750 hp	90.75 (2.61)	6.67 (0.19)	0.26 (0.007)
Rocky Mtn-Big Gypsum, MP 165.7	Reciprocating - 600 hp	63.73 (1.83)	8.11 (0.23)	25.49 (0.73)
Dolores Alternate 1 MP 207.7	Reciprocating - 5,400 hp	156.42 (4.50)	195.52 (5.62)	351.96 (10.14)
Dolores Alternate 2 MP 219.6	Reciprocating - 5,400 hp	156.42 (4.50)	195.52 (5.62)	351.96 (10.14)

[1] Values in parentheses are emissions in grams per second. Emissions listed are based on total compressor engine horsepower at each site.

[2] Source: Questar Colorado State Air Quality Permit Application.

[3] Source: Western Gas Supply Company.

[4] Values are for non-methane hydrocarbons.

[5] Source: EPA's "Compilation of Air Pollutant Emission Factors: Volume I: Stationary Point and Area Sources" (AP-42).

[6] Source: Woodward-Clyde Consultants, "Environmental Report for the TransColorado Gas Transmission Company Natural Gas Transmission Pipeline."

coordinate aesthetic and landscaping considerations.

Meter Stations

Six meter stations, which measure the amount of gas travelling through the pipeline, would be required along the TransColorado proposed route. The land requirement for each meter station would be 0.25 acre. The station design would include orifice plate, turbine meter, gas quality measuring equipment, piping and valves.

Design and construction of meter stations would be in compliance with applicable DOT regulations and FERC guidelines as well as other applicable Federal, state, and local laws, rules, and regulations.

Block Valves

Nineteen manually-operated block valves would be installed within the pipeline ROW. Sectionalizing valves would be installed at 20-mile intervals. The manual block valves would consist of buried, full-bore ANSI 600-ball valves. Block valves would stop the flow of gas in the event of pipeline failure. Gas flow can also be shut down automatically between compressor stations and at gas delivery and receipt points along the pipeline.

Out-of-specification pressure changes would be detected by the gas control center which would be located in Salt Lake City, Utah. In the event of pipeline leaks or ruptures, the gas control center would shut down the compressors through the telemetry system and would dispatch field crews to shut down the manual block valves. The field crews would be located in Durango, Cortez, Dolores, Montrose, Grand Junction, Rifle, Meeker, and Rangely. The time required to shut down the manual block valves would be approximately 0.5 hour from the time of detection during usual working hours, and up to 1 hours during off-hours.

Pigging Facilities

Table 2-5 indicates system components for multi-purpose pigging facilities. Pipeline pigs are used for cleaning and inspecting the integrity of the pipeline wall.

Cathodic Stations

The pipeline would be protected against corrosion with coating and cathodic protection systems. These systems would be installed within 1 year of the completion of the pipeline. System components are included in Table 2-5.

Communication System

Mobile phones and radios would be used during construction of the pipeline. Radio and/or microwave communication equipment would be installed at the compressor stations.

Infrastructure Requirements

Infrastructure needs for the construction of the pipeline and ancillary facilities would include railroads, roadways, and storage areas. TransColorado has submitted a transportation plan with the March 1991 revised portion of the plan of development. This plan indicates the intent to grade or improve 199 miles of existing roadways. Specific roads by name or legal description are listed in TransColorado's plan of development. These roads would include BLM, USFS, and private roads.

Electrical power would be required for the operation of the compressor stations. In most cases, connecting with power distribution lines involves acquisition of less than 0.5 mile of ROW for new facilities. ROW would be approximately 30 feet wide with 40 feet at ROW angles. For the purposes of impact analysis, a 50-foot ROW was used in this draft EIS.

The wild fire suppression policy set forth in the fire plan includes an agreement to supply people and equipment on request by the BLM/FS for wild fire control purposes. Contractors employed by TransColorado would be responsible for suppression costs and damages for all wild fires started as a result of project construction or project employee activities. Contractors would furnish and maintain tools for suppressing wild fires.

Transportation Requirements

Once in the region, equipment and materials would be transported to ROW staging areas on Federal and state highways and county, BLM,

Forest Service, and private roads. Chapter 3, Table 3-8 indicates all state and Federal highways proposed to be used during the construction process. All necessary Federal (including BLM and Forest Service), state, and county road use permits would be obtained prior to construction. TransColorado would observe all applicable regulations regarding transportation on these roadway systems (e.g., load restrictions, oversized load restrictions). Permission to use private roads and any negotiated conditions applicable to this use would be contained in the individual landowner agreements.

According to TransColorado's transportation plan, no new road construction would be necessary for access to the ROW. Existing roads and the pipeline ROW itself would be used for transportation purposes.

Vehicle trips would be greatest for the first 3½ weeks of construction, as heavy equipment used during construction is transported to the ROW and stored on the ROW. At the end of construction, this equipment would be removed from the area. Daily vehicle trips on the local transportation system would consist of those vehicles traveling to and from the ROW once per day, and those vehicles requiring more than one round-trip to the ROW.

Work Force Requirements and Schedule

Pipeline construction would take nine months beginning in April 1992 and ending in December 1992. The pipeline would be constructed by three crews (spreads) working in three separate locations along the pipeline, all at the same time. Three mainline construction spreads would employ an average of 480 workers each with a maximum of 550 persons during peak construction (a 10-week period). In total, approximately 1,440 people would be employed at any one time during the construction phase. Construction employees would work 10-hour shifts 6 days a week. After construction is completed, approximately 20 persons would be employed for the operation of the pipeline and ancillary facilities.

It is anticipated that the majority of construction workers would be based in the more urbanized areas of Grand Junction, Montrose, Farmington, Cortez, and Durango. Pipeline construction workers would be transported by bus from contractor warehouses to construction sites and would be prohibited from using personal vehicles to access the ROW.

Operation and Maintenance

Operation of the pipeline and related facilities would generally be accomplished by remote control. The base station for this control would be in Salt Lake City, Utah. Personnel would monitor the pipeline and could control the operations from the main office. The pipeline would be marked, in accordance with regulations, with appropriate metal signs.

Mobile radio and microwave communications would be used for operation and maintenance of the pipeline. Communication facilities would be located at the compressor stations.

Infrastructure needs required for the operation of the pipeline would be minimal. Gas and electric power would be required to operate offices, communication systems, and ancillary pipeline facilities. Transportation needs would include access to the pipeline ROW and ancillary facilities.

Field personnel would make periodic visits for inspection and maintenance to the compressor stations, meter stations, and pigging facilities.

Field inspections would be conducted on the pipeline ROW and at the ancillary facilities primarily for routine maintenance, corrosion inspection, and leak surveys. Field crews would also be available for unexpected repairs and emergency procedures.

The entire pipeline would be patrolled twice a year in accordance with DOT regulations. Aerial inspections would be conducted by helicopter and would serve to monitor the pipeline conditions and the success of restorative efforts and erosion control. Aerial patrols are intended to ensure adequate surveillance of the entire pipeline system and timely response to problems and concerns.

Noxious weed control would be completed in accordance with existing regulations and landowner or agency agreements. Access for maintenance would be by existing roads and trails, helicopter, or on foot.

Abandonment

The life of the TransColorado pipeline is projected to be 50 years. The projected life may vary as it depends on other gas transportation projects, natural gas supplies, natural gas demand, and prices, among other factors. The pipeline would be abandoned after the termination of its viable life. The pipeline would be purged, cleaned, sealed, and secured. The line would be abandoned in place, while the aboveground facilities would be removed and salvaged. All areas disturbed would be rehabilitated, to the extent possible, to their predisturbed conditions. Abandonment would result in the reversion of the ROW back to the private landowner or controlling agency. Abandonment procedures may vary depending on available technology.

Emergency Response

TransColorado's POD (March 1991) includes a section titled, "Emergency Response Plan." This plan outlines procedures for responding to an emergency, such as fire, explosion, or pipeline rupture. Responsibilities outlined include recordkeeping, rescue response, notification, isolation of damage, repair crew response, and restoration of service. Each operating district will maintain emergency tools and equipment. These will include, but are not limited to keys, lights, maps, manuals, call lists, and report forms.

In the event the pipeline control center in Salt Lake City would detect a change in pipeline operating pressure (indicating a potential leak or rupture), the pipeline section where the pressure change was detected would first be shut down between the nearest compressor stations and or gas receipt or delivery points. Pipeline emergency response crews would then be dispatched to shut down block valves to further isolate the affected 20-mile pipeline section (the distance between block valves). TransColorado estimates that ground response time to any particular block valve would be 0.5 hour during working hours, and 1.0 hour during off-hours. TransColorado would be primarily responsible for shutting down the pipeline, and eliminating the gas supply to the leak or rupture point. In the event of a fire, local fire fighting agencies would be primarily responsible for responding to, and controlling the fire.

Also included in the POD is a section titled, "The Fire Plan." This plan provides fire prevention and response measures to be employed by any and all employees, contractors, and subcontractors and their employees. Prevention practices would include restrictions on burning and blasting, use of spark arrestors, provision of designated safe smoking areas, and storage areas for flammable substances.

Environmental Protection Measures

This section lists general and site-specific environmental protection measures that TransColorado has committed to employ during the construction, operation, and maintenance of the pipeline.

General Protection Measures

A detailed description of the general procedures and their probable locations is included in the TransColorado plan of development, which is available from the BLM or Forest Service upon request. The majority of the site-specific measures were developed from interagency and public scoping meetings, FERC requirements, company standard practices, and Federal agency land use plans (see Chapter 1, "Relationship to BLM and Forest Service Policies, Plans, and Programs"). These measures are currently planned for inclusion in the ROW permits that will be issued by the BLM, USFS, and in the FERC certificate. Waivers and/or modifications may be granted by the appropriate agency if the site-specific conditions warrant change. These measures would be applied to both private and Federal lands unless otherwise noted. Final protection measures will be available in the final EIS. Table 2-7 lists the general protection measures.

TABLE 2-7

General Protection Measures

MONITORING AND COMPLIANCE

1. An independent, private environmental inspector would be hired for each spread to monitor construction and ensure compliance with approved construction and environmental protection measures on private and state lands. A Federal authorized officer would be responsible for monitoring and compliance on Federal lands.

AIR QUALITY

1. Federal, state, and local air emission standards will be met.
2. Water, or other means, to control dust will be provided in accordance with Federal, local, or state requirements.
3. Construction equipment will be properly maintained to reduce emissions.
4. Dust abatement procedures shall be used at all times when working within 500 feet of the power transmission line ROW.

TOPOGRAPHY

1. Areas of unstable slopes, active faults, and locations of mines will be identified prior to construction. Proper mitigation will be developed (i.e., alternate locations, stronger pipe, installation of monitoring equipment, installation of block valves to isolate area, use of low-density backfill to allow for pipe movement) from geotechnical investigations as directed by the authorized officer.
2. Site-specific geotechnical evaluations of compressor sites will be conducted prior to construction to determine foundation requirements.
3. Fault crossings will be assessed and site-specific mitigation measures will be developed (i.e., thicker pipe walls, shut-off valves, and low-density backfill) to maintain safety of pipeline.

SURFACE WATER QUALITY

General Construction

1. Sediment filter devices will be installed, inspected, and repaired to minimize sedimentation where needed or required.
2. Proper riprap application or other techniques will be used to stabilize stream banks where needed or required.
3. Proper water management techniques will be used to prevent silt from entering water channels.
4. Natural drainages will be protected and restored to original contour and patterns to reclaim site.
5. Drainage structures will be installed as necessary to maintain natural surface drainages.
6. Sediment filter devices will be maintained at base of slopes located adjacent to streams until ROW revegetation is complete.
7. The pipeline will be located at least 50 feet from springs unless waived by the affected line manager and the authorized officer.
8. Exact locations of water wells will be determined prior to construction and the pipeline rerouted to maintain a minimum of 50 feet of clearance from the well.
9. In narrow and deep channels with a flat bottom and little likelihood of further incision, 4-foot depth of pipe burial will be extended laterally from the channel center line a total distance of 3 times the channel depth. The side walls of the cut in the channel bank will be laid back at an angle of 1.5:1 (horizontal:vertical).

TABLE 2-7 (CONTINUED)

10. In deeply incised channels (V-notched cross-section) pipe will be buried 6 feet below channel bed; depth of burial will be extended laterally from the channel center line a total distance of 3 times existing channel depth. The side walls of the cut in the channel bank will be laid back to a slope of 1.5:1.
11. To protect groundwater from accidental fuel spills and contamination, no vehicles will be fueled within a 200-foot radius of all private wells and a 400-foot radius of all municipal water supplies.
12. USFWS, State Fish and Game Department, and EPA will be consulted regarding withdrawal and disposal of hydrostatic test of water.

Stream Crossings

1. Staging areas will be located at least 50 feet from stream bank on BLM and private lands and 100 feet on USFS lands to maintain buffer zone and avoid water pollution unless waived by the affected line manager and the authorized officer.
2. No storage of fuels or petroleum products will be allowed within 100 feet of any stream bank to avoid water pollution.
3. Perennial stream crossings would be constructed during the low water period as approved by authorized officer.
4. U. S. Corps of Engineers will make a determination regarding Section 404 and Section 10 permits. All crossings could be permitted under the nationwide permit system.
5. State-issued stream crossing permits will be obtained, if required.
6. Section 401 water quality certification waiver will be obtained.
7. Stream crossing will be constructed perpendicular to the stream to minimize length of disturbance.
8. Stream banks will be backfilled to original contour, using gravel or riprap, if necessary.
9. Construction equipment crossing streams will be minimized; culverts, or portable bridges will be used to reduce sedimentation and bank degradation.
10. Minor perennial stream crossings will be completed within 24 hours (<10 feet wide), if possible.
11. Major stream crossings will be completed within 72 hours (>10 feet wide and < 100 feet), if possible.
12. Site-specific construction plans will be submitted to appropriate agencies for all river (100 feet width or greater) crossings.
13. Authorities responsible for potable water supplies located within 3 miles downstream will be notified at least 72 hours prior to instream work.
14. State authorities will be notified at least 48 hours prior to commencement of Instream trenching or blasting in major stream crossings.
15. Low-water crossings will be constructed so as not to block or restrict the existing channel.
16. Low-water crossings will be rehabilitated using material removed during construction to avoid new borrow areas.
17. Flow of spoil off ROW will be prevented to minimize downstream sedimentation.
18. Stream flow will be maintained to protect fisheries and aquatic habitat during construction of stream crossings.
19. ROW will be aligned to avoid loss of mature riparian trees.
20. Irrigation ditches and canals will be monitored for two seasons to ensure the integrity of the ditch and canal banks.
21. All permanently lined irrigation ditches and canals will be bored.

TABLE 2-7 (CONTINUED)

22. Mudboards will be installed to provide a working surface for equipment on unstable areas as determined by the authorized officer.
23. On streams less than 10 feet wide and considered a significant fishery the dry ditch method of construction will be used using flume pipe.
24. Rock waterways may be constructed where high seasonal flows are expected.
25. Major stream crossings will be by the open-cut trench method utilizing tracked backhoes.
26. Abandoned water diversions will be plugged and filled to prevent trapping fish.
27. Sediment in the Dolores and San Miguel Rivers will be tested for sediment contamination prior to crossing. If contaminants are found, a site-specific remediation plan will be developed to control re-suspension of contaminated sediments.
28. The pipeline will be buried below the maximum estimated scour depth of a 100 year flood at all stream crossings.
29. No aboveground facilities will be located within any 100 year flood plains.

Water Use

1. Water withdrawal permits will be obtained for hydrostatic testing and dust control to protect water rights.
2. Proper intake procedures will be used to prevent entrainment of fish and maintain flow rates in source streams.
3. Discharge permits (local, state, NPDES) will be obtained for test water disposal.
4. Test water will be sampled during discharge and treated, if necessary, in accordance with permit to avoid pollution.
5. Dispersion devices or containment structures will be used when discharging test water to avoid erosion.
6. No more than 5 percent of current flow will be withdrawn from any source.
7. Discharge of hydrostatic test water will not be made into HQ1 or HQ2 streams.

WETLANDS

1. Wetland areas will be avoided to maximum extent possible.
2. Staging areas will be located at least 50 feet from wetland edge on BLM and private lands and 100 feet on USFS lands to maintain buffer zone and avoid water pollution.
3. Petroleum products will not be stored within 100 feet of wetlands to avoid water pollution.
4. Construction of aboveground facilities will not be permitted In Federally delineated wetlands and all areas located in 100 year flood plains.
5. Sediment filter devices will be installed to prevent spoil drift and sedimentation where needed and required.
6. U.S. Army Corps of Engineers will be notified of construction activities when required.
7. State-issued wetland crossing permit will be obtained, if required.
8. Construction ROW in wetland crossings will be less than 75 feet wide to minimize disturbance.
9. Proper clearing techniques will be utilized, leaving roots In place to maintain stability of soils.
10. Wide-track or balloon-tire construction equipment (or proper equipment pads) will be utilized to minimize disturbance.

TABLE 2-7 (CONTINUED)

11. No fertilizer or lime will be used in reclamation activities to prevent eutrophication of wetlands.
12. Soil, rock, tree stumps, or brush riprap will not be used to stabilize ROW to avoid altering the substrate.
13. Sediment filter devices will be installed and maintained at the base of all slopes adjacent to wetlands after construction.
14. Disturbed areas will be revegetated to restore productivity and minimize visual intrusion.
15. Native herbaceous and woody plant species will be monitored to ensure they permanently revegetate.
16. Proper construction techniques will be used to prevent silt from flowing into wetlands.
17. ROW will be aligned to avoid beaver ponds or artificial ponds.
18. Agreements with landowners will be developed to provide short-term protection of stream banks from livestock.
19. Construction across narrow wetlands (<200 feet) will consist of using a work pad (mud board) for the equipment, and the pipe will be placed as though it were on dry ground.
20. Construction across wide wetlands (>200 feet) will consist of laying pre-fabricated sections of the pipe into the trench, utilizing flotation devices.

SOILS

1. Topsoils will be stripped from disturbed areas to a depth of 12 inches or to a depth specified by the landowner/land managing agency. The landowner/land managing agency may also specify the width of topsoil to be stripped but the minimum width should encompass the area over the trench and under the subsoil spoil pile.
2. On saline soils (shale badlands) the top 6 inches of soil over the area to be excavated will be stripped, windrowed, and replaced after construction to encourage revegetation by native seeds present in the topsoil.
3. Steep slopes will be graded properly to minimize erosion.
4. Cuts and fills will be minimized to reduce the amount of exposed soils.
5. Proper blasting techniques will be used to aid in safety and minimize disturbance.
6. Proper trenching techniques will be used to minimize disturbance.
7. Construction restrictions during wet weather (temporary shutdown) will be followed to avoid road and site disturbance (ruts 4 inches or greater).
8. Terraces and benches will be constructed on steep slopes to minimize soil exposure and erosion.
9. Cut and fill will not be used unless side slopes exceed 3 percent to minimize soil exposure and erosion.
10. Proper backfilling with compaction and contouring will be done to aid in site reclamation.
11. Backfill will be mounded over trench approximately 0.5 foot to account for subsidence unless otherwise requested by the land manager/landowner.
12. Topsoil replacement will be performed over entire disturbed area, sufficient for refilling and mounding.
13. Erosion control measures shall be initiated within 10 days after the trench is backfilled to aid in site stabilization.
14. Permanent erosion control shall drain away from disturbed area and begin and end in vegetation or rock.
15. Excess or unsuitable materials will be disposed of at approved locations.

TABLE 2-7 (CONTINUED)

16. Permanent water bars will be constructed on all slopes to help control runoff. Spacing will be as follows or as directed by the authorized officer or landowner.

Slope	Spacing
0-2%	120 feet
2-5%	100 feet
5-10%	75 feet
10-20%	50 feet
20 % +	30 feet

17. Sediment barriers will be installed and maintained at the base of slopes located adjacent to road crossings until ROW revegetation is complete, or as directed by the authorized officer.

18. Noxious weed-free sediment barriers will be installed at stream, river, and wetland crossings to minimize sedimentation.

19. Trench breakers will be constructed to prevent water runoff in the ditch after pipeline installation.

20. Topsoil will not be used for the construction of trench breakers.

21. Fertilizer will be used to enhance vegetation where recommended.

22. Snow will not be mixed with fill or topsoil during construction to avoid soil losses.

23. Relieve soil compaction in agricultural areas so that bulk density of soils on ROW approximates that of soils on adjacent undisturbed agricultural areas to maintain soil productivity.

24. Compacted soil conditions will be relieved before topsoil is replaced.

25. Topsoil will not be redistributed if the ground or topsoil is frozen.

26. Remove rocks on ROW to approximate pre-construction conditions.

27. Any blasting near the power transmission line ROW shall include blasting mats or berms so that flyrock or debris will not damage the transmission facilities. Utilities shall be notified prior to all blasting in the ROW.

SOLID WASTE

1. Construction sites will be maintained in a sanitary condition.

2. Waste will be disposed of at an authorized disposal site.

3. A litter policing program will be implemented to avoid litter and visual impacts.

VEGETATION

1. Appropriate clearing techniques will be utilized to preserve roots, stockpile or dispose of vegetation wastes to maintain stability of site and provide erosion control.

2. Construction and reclamation bond will be provided to ensure reclamation.

3. Non-linear ROW techniques (feathering) will be used to minimize visual impacts.

4. Native species will be incorporated as practical in the reseeding mixture (see Table D-1).

5. Local authorities (Soil Conservation Service) will be included in reclamation planning for site-specific information.

6. Turf and landscaping will be restored to landowner requirements.

7. Seedbed preparation will be conducted to 3- to 4-inch depth to enhance revegetation (scarifying, tilling, harrowing).

8. Seeding will be conducted during the normal seeding season with proper seed mixture and techniques (certified seeds, proper seeding, and amount).

TABLE 2-7 (CONTINUED)

9. If construction is completed more than 30 days before the normal seeding season, temporary erosion control measures shall be used.
10. Mulch application will be used in sensitive areas (dry, sandy, steep slopes) to control erosion, as directed by the authorized officer.
11. Where wood chips are used as mulch, topdress will be with nitrogen at rates specified by the authorized officer or landowner.
12. Thatching or fiber blankets will be used on stream banks and areas of high erosion potential to control erosion, if needed.
13. Special land preparation will be accomplished on "critical areas" to control erosion and enhance revegetation.
14. Continuing revegetation efforts will be provided to ensure adequate cover until vegetation is established.
15. Procedures for application of herbicides, pesticides, and fertilizers will be identified where needed.
16. Cleared vegetation will be disposed of as directed by the authorized officer.
17. Seed will be used within 12 months of testing to assure seed viability.
18. Seed will be drilled, where feasible, to enhance germination.
19. If broadcast or hydroseeding methods are used, seeding rates will be double the recommended seeding rates.
20. Inspection will occur after first and second growing seasons to determine need for further restoration.
21. Revegetation success will be monitored for the life of the project. Problem areas will receive additional revegetation efforts.
22. ROW will be maintained weed-free for 5 years after construction.
23. Mulch, when used, will be anchored immediately after placing to minimize loss by wind and water.
24. Construction vehicles must arrive at the site in a clean and weed free condition.

FORESTRY

1. Merchantable timber will be purchased by TransColorado.
2. Downed timber may be hauled off site or scattered on the ROW, at the agencies' direction.
3. If timber is scattered, it shall be done after seeding.
4. Unmerchantable timber may be left on the ROW as a barrier to vehicular traffic and to impede erosion.
5. Trees 3 inches in diameter or larger at ground level within the ROW will be cut and not pushed over except in the actual trench where stumps will be pulled during trenching.
6. Trees hung up during felling will be put on the ground immediately as a safety measure.

PRIME AND UNIQUE FARMLANDS

1. Construction will be timed to minimize impacts to cropland in accordance with landowner agreement.
2. All disturbed drain tiles will be located, tested, and restored to original condition.
3. Return agricultural land to its original condition (soil profile restored, compaction relieved, and tilled as requested by the landowner).
4. Compensation for crop and orchard losses will be provided.

TABLE 2-7 (CONTINUED)

5. All rehabilitation will be completed according to landowner or SCS guidelines, provided these stipulations are included in the landowner easement agreement.

LIVESTOCK GRAZING

1. Grazing deferment plans may be developed with landowners and grazing permittees to minimize grazing disturbance until ROW revegetation is complete.
2. All damaged livestock facilities (fences, water sources) will be repaired to landowner's satisfaction. Temporary fences will be installed when necessary, to prevent livestock movement across fences temporarily removed for construction.
3. Compensation or temporary measures will be provided for any critical facilities (such as watering sites) that are disrupted during the construction and restoration process.

WILDLIFE

1. Seasonal closures will be observed for elk, deer, antelope, sage grouse, heron, and other specified species unless waived by authorized officer.
2. All non-essential access roads would be closed along the operational ROW to prevent disturbance impacts to wildlife.
3. A nesting raptor survey will be conducted prior to construction.

THREATENED OR ENDANGERED SPECIES

1. Informal Section 7 Consultation will be initiated, and a Biological Opinion will be sought from the USFWS.
2. Threatened and endangered species clearance will be obtained from appropriate authorities.
3. Clearance surveys for sensitive plant species will be conducted prior to construction.
4. Prairie dog towns along the pipeline will be mapped and, if the towns are of sufficient size (according to USFWS guidelines), black-footed ferret clearance surveys will be conducted.
5. Construction will be restricted in key bald eagle wintering areas between November 15 and April 15, unless waived or modified by authorized officer.
6. Construction near active (listed proposed and candidate species) raptor nests will be restricted between February 1 and August 15 (distance restrictions and dates vary with raptor species) unless waived or modified by authorized officer.
7. Site-specific mitigation plans will be developed with the USFWS for any impacted T&E species.
8. No bald eagle winter roost trees will be disturbed by pipeline construction.
9. A survey of spotted owl habitat will be conducted to determine presence of the species.
10. Willow stands adjacent to the Gunnison River that are occupied by nesting Southwestern willow flycatchers will not be disturbed by construction.
11. Scheduled maintenance should be done to avoid crucial bald eagle and raptor use periods.
12. Emergency maintenance in crucial bald eagle or raptor areas will require notification of the appropriate land management agency (if public land), the USFWS and the Colorado Division of Wildlife or the New Mexico Game and Fish Department.
13. Stream and river crossings in any occupied threatened and endangered fish habitat would be completed at non-crucial periods.

TABLE 2-7 (CONTINUED)

WILD HORSES

1. During construction, cuts will be made in open trenches (at BLM-specified intervals) in the Spring Creek Basin horse range to allow horses to cross the open trench.

CULTURAL RESOURCES

1. Culturally sensitive resource areas will be avoided to prevent disturbing archaeological sites or mitigated in order to reduce adverse effects to those sites.
2. Required procedure will be followed if cultural discovery is made during construction.
3. Archaeological inventories will be conducted prior to construction.
4. A cultural resource awareness program will be implemented prior to construction to minimize impacts to archaeological sites.

PALEONTOLOGY

1. Proper procedures will be followed if paleontological resources are discovered during construction.

VISUAL RESOURCES

1. Visual impacts on Grand Mesa, Bookcliffs, and the Grand Valley as well as other scenic areas will be avoided or mitigated.
2. Visual intrusions of compression and metering facilities will be mitigated as specified by the authorized officer. Some specific measures are:
   - Limit disturbance to minimum area necessary;
   - Perform careful, detailed siting and design of facilities to minimize visual contrast, and take advantage of topographic or vegetative screening; and
   - Select materials and colors to blend with the surroundings.
3. Aboveground facilities will be painted to blend with natural surroundings (where not precluded by safety regulations) to minimize visual intrusion.
4. The boundary of the ROW will be feathered to minimize straight, non-natural lines, especially in forested areas as directed by the authorized officer.
5. Views down the ROW will be minimized by breaking long, straight lines of pipe with ROW angles.
6. Native vegetation will be planted at road, trail, and key visual viewpoints to break view of ROW and blend with natural landscape.
7. ROW width in high-value visual areas will be minimized.
8. In all disturbed areas provide successful regeneration of plant cover including indigenous species (see Table D-1).
9. Existing parallel roads or utility corridors will be used as part of the disturbed zone for access or stockpiling.
10. Consolidate the pipeline into a common corridor with existing, nearby utilities when they would be visible in separate corridors.
11. Minor relocations of pipeline to a less topographically prominent position will be made where a significantly less visible alignment exists nearby.

TABLE 2-7 (CONTINUED)

RECREATION

1. Temporary access will be made available for any major campgrounds or trails blocked by construction.

TRANSPORTATION

1. Boring techniques will be used under major or busy roadways to avoid disrupting traffic.
2. During temporary shut-down, ROW shall be blocked to avoid unauthorized entry.
3. Adequate safety precautions and traffic control (detours, flagmen) will be provided for traffic safety in accordance with Federal, state, or county requirements.
4. Any disturbed local roadways will be repaired or replaced to maintain transportation network.
5. All public and private roadway crossings and access points will be restored to safe and acceptable conditions.
6. Minor road crossings will be completed in 24 hours or less to minimize traffic disruption.
7. Access to existing Western Area Power Administration utility lines will not be blocked.
8. All roads constructed across Western Area Power Administration's transmission access system shall allow heavy equipment to use the road at least to a standard of H-20 loading. This shall be achieved without increasing the elevation of the road surface in such a manner that would cause high centering of maintenance vehicles.
9. TransColorado will participate in the maintenance of roads used to access the ROW and ancillary facilities in conjunction with other facilities.
10. On USFS lands, no rutting will be allowed on gravel surfaced roads and up to 2-inch deep ruts will be allowed on non-surfaced roads.

LAND USE, ZONING, AND LOCAL COMMUNITIES

1. TransColorado shall protect the valid existing rights of all permittees, licensees, ROW holders, leases, mining claimants, and any other holding valid authorizations on BLM and Forest Service lands.
2. Access clearance or access permits will be obtained.
3. Pre-construction meetings with affected parties will be conducted.
4. All necessary Federal, state, and local permits will be obtained.
5. A survey and flagged or staked ROW will be provided to landowners.
6. ROW easements will be negotiated with private landowners.
7. Pipe will be bent to reasonably fit the vertical and horizontal plane of land to minimize trenching.
8. Necessary land use and zoning permits will be obtained.
9. Land use plans and subdivision plats will be reviewed to avoid incompatible uses.
10. All existing improvements, such as fences, gates, irrigation ditches, and cattle guards, will be maintained and repaired to at least pre-construction condition to minimize disturbances to the public.
11. Measures will be provided to control use of ROW (natural barriers, gates, or tree planting) and prevent unauthorized travel for the life of the project.
12. Pipeline will be rerouted to avoid houses in the ROW.
13. All aboveground facilities will be located outside of 100 year floodplains.
14. Major storage yards used during construction will be located outside of 100 year flood plains.

TABLE 2-7 (CONTINUED)

PUBLIC HEALTH AND SAFETY

1. A fire prevention and suppression plan will be prepared and followed to avoid fire and maintain public safety.
2. Spark arrestors will be used during construction, operation, and maintenance to prevent fires.
3. Coordination with affected utilities will be done to avoid utility disruptions.
4. Safety measures will be provided to protect workers and the public from electric shocks.
5. An emergency response plan will be prepared and followed for leaks and spills (hazard areas, wetlands, stream crossings) to protect the public.
6. Compressor stations will be designed to limit noise levels attributable to their operation to 55 decibels of the A-weighted scale at nearby noise-sensitive areas.

Site-Specific Protection Measures

Table 2-8 lists BLM and Forest Service site-specific environmental protection measures that would be required of TransColorado for project approval. These measures, listed as stipulations, were developed based on decisions in the applicable BLM and Forest Service land use plans. As dictated by these plans and agency policies, exceptions to the listed stipulations are permitted by waivers or modifications and must be in writing and signed by both the affected line manager and the Authorized Officer for the project. The site-specific stipulations would be included in the ROW grants issued to TransColorado should the project be approved. The source of each stipulation is indicated. Table 2-9 lists the road and area closures on National Forest land. Table 2-10 indicates the location of recreationally and economically important wildlife species.

TABLE 2-8

Transcolorado Gas Transmission Project
Site-Specific Environmental Protection Measures

Stipulation	Exception
Paleontological Resources Stipulation	
Paleontological surveys shall be conducted within the 75-foot right-of-way where it intersects BLM/FS Class I paleontological areas. The surveys shall be conducted by a qualified paleontologist prior to pipeline construction. Any significant fossils found during the surveys will be avoided or excavated as instructed by the applicable BLM/USFS office. Following is a listing of the Class I areas for each BLM resource area/Natural Forest: 1. Wasatch, Williams Fork, Green River, and Uinta Formations (White River Resource Area). 2. Morrison and Wasatch Formations (Grand Junction Resource Area). 3. Morrison Formation (Uncompahgre Basin Resource Area). 4. San Jose, Dolores, Morrison, and Chinle Formations (San Juan Resource Area). 5. Morrison Formation (San Juan National Forest, Uncompahgre National Forest).	
Soils and Water Stipulations	
Surface-disturbing activities shall be prohibited within 100 feet of perennial streams in the Grand Junction Resource Area (Grand Junction Resource Management Plan).	Does not apply to essential utility crossings
Surface disturbance shall be limited in the Palisade watershed and interference with the Palisade watershed shall be avoided (Grand Junction Resource Management Plan). Blading will be limited to that needed for excavation of the pipeline trench and must not exceed 35 feet in width. No blading will be allowed in the remaining 15 feet of the graded ROW.	May be waived or modified during siting of the pipeline if doing so would not result in unacceptable impacts to the watershed.
Surface occupancy shall be prohibited on slopes greater than 40 percent (Figure 3-1). Other surface-disturbing activities shall be allowed only after analyzing site-specific conditions and potential for safety hazards and reclamation (Grand Junction Resource Management Plan).	Waivers or modifications permitted if TransColorado agrees to the following measures to protect soils, water, and vegetation resources on these steep slopes. Additional measures may be added as needed during siting of the pipeline:

TABLE 2-8 (CONTINUED)

Stipulation	Exception
	a. Prior to any grading and trenching in these areas, a temporary retaining barrier consisting of a woven mesh-type material will be installed at the edge of the defined ROW to hold the spoil material on the slope. Grading and trenching will be accomplished using smaller earth-moving equipment and backhoes. Trench breakers will be used to minimize soil erosion.
	b. After the ROW has been restored to a condition acceptable to BLM, waterbars will be constructed to: (1) ensure that soil erosion is minimized; (2) simulate the imaginary contour lines of the slope (ideally with a grade of 1 to 2 percent); (3) drain away from the disturbed area; and (4) begin and end in vegetation or rock where possible. A closer spacing of waterbars may be required on steep slopes to reduce channelization. Waterbars will be installed according to the following table: Slope (%) — Spacing Interval (feet) 0-2 — 120 2-5 — 100 5-10 — 75 10-20 — 50 >20 — 30
	c. When appropriate, slash will also be used to control erosion. Silt and runoff retention basins may be constructed along the ROW to reduce erosion. The BLM will approve site locations and develop minimum standards for the basins.
	d. Areas disturbed either indirectly by passage of construction equipment or directly by trenching and backfilling will be seeded with a BLM approved mixture. Seeding will be done during the months of September through November. If seeding is not accomplished until the following year, all annuals and undesirable vegetation (Russian thistle, Halogeton, etc.) will be eradicated prior to seeding. The seeds will be planted using a drill equipped with a depth regulator to ensure proper depth. Where drilling is not possible, seed will be broadcast and the area will be chained to cover the seed. When broadcasting the seed, the pounds of pure live seed/acre will be doubled.
	e. After the ROW has been restored and seeding has been completed, an approved matting will be installed to stabilize the soil. This matting will only be necessary on very steep slopes selected by the BLM.

TABLE 2-8 (CONTINUED)

Stipulation	Exception
Surface-disturbing activities will be prohibited on highly erodible soils (Figure 3-4) from March 1 to May 31 to minimize erosion and salt yields during periods of high soil moisture (Uncompahgre Basin Resource Management Plan).	May be waived or modified if soil conditions permit construction without creating ruts greater than 4 inches in depth.
No long-term adverse impacts on public lands will be allowed to riparian/aquatic systems of Cottonwood and Roubideau Creeks (Uncompahgre Basin Resource Management Plan). Removal of all trees and shrubs in the riparian areas of Cottonwood and Roubideau Creeks shall be prohibited.	May be waived or modified if TransColorado can demonstrate that removal of trees and shrubs in the riparian areas would not result in long-term impacts to the riparian/aquatic systems of Cottonwood and Roubideau Creeks. In addition, any trees or shrubs approved for removal shall be replaced with willow clumps or cottonwoods from nursery stock or some source other than adjacent BLM land. Plants shall be protected from livestock and wildlife.
Wildlife Stipulations	
Disturbing activities shall be prohibited in key, (severe winter range, crucial range, winter concentration areas, fawning areas, calving areas, sage grouse leks, heron rookeries, raptor nests) ranges and nesting areas (Figures 3-6, 3-7, and Table 2-6) during the times listed below. These dates are based on the most conservative agency recommendations for areas crossed by the TransColorado Project. Recommended dates vary between BLM Resource Areas, National Forests, and state wildlife agencies. Key Winter Range Mule Deer 12/1-5/1 Elk 12/1-5/1 Antelope 12/1-5/1 Fawning, Calving Areas - Mule Deer 5/15-7/1 Elk 5/1-7/1 Antelope 5/1-7/1 Sage Grouse Nesting/Breeding Areas - No activity within 2 miles of an active sage grouse lek between 3/1-7/15 Nesting Waterfowl Areas - 3/15-6/30 Heron Rookeries - No activity within 0.5 miles between 3/15-7/31 Ferruginous Hawk - no activity within 1 mile of the nest between 2/1-8/15 Golden Eagle - no activity within 0.5 miles of the nest between 2/1-8/15	May be waived or modified if TransColorado can demonstrate that disturbing activities during seasonal closures could be conducted without causing unacceptable impacts to wintering animals, big game calving/fawning areas, nesting/breeding sagegrouse, nesting heron, and nesting raptors.

TABLE 2-8 (CONTINUED)

Stipulation	Exception
Other Raptor Nests - no activity within 0.5 miles of the nest between 2/1-8/15 (no stipulations cover the American kestrel), the dates and distances vary according to raptor species.	
Major utility corridors are excluded in key big game areas shown on Figure 3-6 in the San Juan, San Miguel Resource Areas, to protect wintering big game habitat.	Exceptions may be authorized on a case-by-case basis depending on the site-specific impact of the proposal (San Juan/San Miguel Resource Management Plan). May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts to wintering big game habitat. In addition, TransColorado must agree to re-establish sagebrush, fourwing saltbush, or other appropriate shrubs for winter forage.
Threatened and Endangered Species Stipulations Disturbing activities shall be prohibited in key habitats for threatened and endangered species during the following periods and within the following buffer zones. In addition, TransColorado must agree to not remove any trees larger than 20 feet in height or any snags. This applies to all large trees and identified communal roosts. Recommended avoidance periods and buffer zones vary between BLM Resource Areas, National Forests, and state wildlife agencies. The following buffer zone recommendations are from USFWS bald eagle (USFWS 1982) and peregrine falcon (USFWS 1984) recovery plans and USFS (USFS 1991B) Region 3 Mexican Spotted Owl Guidelines. The following avoidance periods are based on the most liberal agency recommendations for key habitats crossed by the TransColorado project. Bald Eagle Nesting site - no activity within 0.5 miles of the nest between 11/15-7/31. Winter roost - no activity within 0.25 mile of the roost between 11/15-4/15. Winter concentration areas no activity within 0.25 mile of the winter concentration area between 12/1-4/15.	May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts to threatened or endangered species.

TABLE 2-8 (CONTINUED)

Stipulation	Exception
Peregrine Falcon Nesting site - no activity within 1 mile of the nest between 3/15-7/31.	
Mexican Spotted Owl - Establish a 450 acre core area and a 2,000 acre territory around any Mexican spotted owl nest. Restrict activities within core area. If it is not legally possible to restrict activities, no activities will be permitted within the core area between 2/1-7/31. Disturb no more than 516 acres of the 2,000 acre territory.	
Cultural Resources	
TransColorado shall conduct a Class III cultural resource inventory within a 200-foot corridor along the approved pipeline route prior to pipeline construction. The inventory shall be conducted by an archaeologist approved by the BLM/USFS in accordance with the Programmatic Agreement signed by the BLM, Advisory Council on Historic Preservation, Forest Service, Southern Ute Indian Tribe, State Historic Preservation Officers in Colorado and New Mexico, and TransColorado. Cultural resources will be evaluated and protected according to a BLM/USFS-approved Treatment Plan submitted by TransColorado following the survey.	
Travel Restrictions:	
Areas shown on Figure 3-9 and listed on Table 2-6 are closed yearlong to off-road or off-trail motorized vehicle travel to prevent erosion and area use conflicts (San Juan National Forest Land and Resource Management Plan).	May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts. This stipulation shall not be waived for scheduled maintenance.
Areas listed on Table 2-6 are closed to motorized vehicles from December 1 to March 31 yearly to protect wildlife winter range (San Juan National Forest Land and Resource Management Plan).	May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts to wildlife winter range. This stipulation shall not be waived for scheduled maintenance.
Roads listed on Table 2-6 are closed to motorized vehicles from November 1 to June 30 yearly to prevent road damage (Grand Mesa, Uncompahgre, and Gunnison National Forests Land and Resource Management Plan).	May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts to roads. This stipulation shall not be waived for scheduled maintenance.

TABLE 2-9

TransColorado Gas Transmission Project
Road and Area Closures
Proposed Action and Agency Preferred Alternative

Route	Description	Milepost	Comments
Proposed Action	Ryman Creek Area (T41N, R15W, & R16W)	187.3-194.2	San Juan NF yearlong closure to off-highway vehicles (OHVs). Roads 240 and 241 are closed to motorized vehicles from December 1 to March 31.
Proposed Action		235.0-236.6	San Juan NF yearlong closure to OHVs. Road 328 is closed to motorized vehicles from December 1 to March 31.
Proposed Action		236.8-237.2	San Juan NF yearlong closure to OHVs.
Proposed Action		238.7-240.0 242.4-242.6 243.3-244.1	San Juan NF yearlong closure to OHVs.
Agency Preferred Alternative		231.0-231.3	
Proposed Action and Agency Preferred Alternative	Uncompahgre	145.6	Uncompahgre NF Closure form 11/1-5/30 Road 540

TABLE 2-10

TransColorado Gas Transmission Project
Recreationally and Economically Important Wildlife Species
Located in the Vicinity of the TransColorado Proposed Action

Species/Habitat[1]	Milepost[2]	Distance from Right-of-Way[3]
Mule Deer Severe Winter Range	0.0-6.3	0
Mule Deer Crucial Habitat	0.0-6.3	0
Elk Winter Range	10.0-18.0	0
Sage Grouse Nesting Area	14.5-19.0	0
Sage Grouse Lek	16.8	0.25 mile west of ROW
Sage Grouse Lek	17.0	0
Elk Crucial Habitat	18.0-32.5	0
Sage Grouse Nesting Area	23.5-30.0 26.0-30.0	0
Elk Winter Range	29-37.0	0
Sage Grouse Nesting Area	30.5-37.0	0
Sage Grouse Lek	32.8	200 feet south of ROW
Mule Deer Winter Concentration Area	34.5-47.5	0
Mule Deer Severe Winter Range	34.5-52.0	0
Mule Deer Crucial Habitat	34.5-52.0	0
Elk Winter Range	47.5-54.5	0
Elk Crucial Habitat	48.5-51.0	0
Elk Winter Concentration Area	48.5-52.0	0
Elk Severe Winter Range	48.5-51.0	0
Elk Migration Route	50.0-52.0	0
Elk Winter Range	58.0-72.0	0
Elk Crucial Habitat	60.0-61.0	0
Elk Winter Concentration Area	60.0-61.0	0
Elk Severe Winter Range	60.0-61.0	0
Mule Deer Winter Concentration Area	60.0-64.0	0
Mule Deer Crucial Habitat	60.0-62.5	0

TABLE 2-10 (CONTINUED)

Species/Habitat[1]	Milepost[2]	Distance from Right-of-Way[3]
Elk Winter Concentration Area	64.0-67.0	0
Elk Winter Range	73.0-77.0	0
Elk Crucial Habitat	75.0-76.5	0
Elk Severe Winter Range	75.0-76.5	0
Mule Deer Winter Concentration Area	75.0-78.0	0
Mule Deer Severe Winter Range	75.0-77.5	0
Mule Deer Crucial Habitat	75.0-77.5	0
Pronghorn Antelope Overall Range	83.2-103.9	0
Pronghorn Antelope Winter Range	87.2-103.9	0
Bighorn Sheep Overall Range	91.2-96.2	4.5 miles Southwest of ROW
Pronghorn Antelope Winter Concentration	100.2-102.2	1.4 miles West of ROW
Pronghorn Antelope Overall Range	106.2-112.3	0
Pronghorn Antelope Winter Range	106.2-112.3	0
Elk Winter Range	103.2-132.7	0
Elk Severe Winter Range	105.9-126.8	0
Mule Deer Winter Range	103.2-131.1	0
Mule Deer Severe Winter Range	105.9-126.9	0
Mule Deer and Elk Summer Range	131.1-142.9	0
Mule Deer Winter Range	142.8-193.9	0
Elk Winter Range	142.6-195.2	0
Mule Deer Winter Concentration Areas	147.4-150.4 153.2-157.4 160.2-174.2	0
Elk Calving Area	143.0-144.2	0
Elk Calving Area	144.2	0.3 mile Northwest of ROW
Elk Winter Concentration Area	147.4-150.2	0
Mule Deer Severe Winter Range	156.1-157.4 159.3-173.4	0 0
Elk Severe Winter Range	155.9-157.4 159.0-174.4	0

TABLE 2-10 (CONTINUED)

Species/Habitat[1]	Milepost[2]	Distance from Right-of-Way[3]
Sage Grouse Lek	168.2	1.0 mile Southeast of ROW
Sage Grouse Nesting	171.2-172.7	0.7 mile Northwest of ROW
Sage Grouse Winter Range	168.2-173.7	0
Sage Grouse Nesting Area	168.2-173.7	0
Sage Grouse Lek	171.7	3.7 miles Northwest of ROW
Pronghorn Antelope Winter Range	168.7-172.7	0
Pronghorn Antelope Overall Range	168.7-172.7	0
Pronghorn Antelope Winter Range	177.3-180.7	0
Mule Deer Winter Concentration Area	181.5-191.6	0
Elk Severe Winter Range	182.8-190.6	0
Mule Deer Migration Route	188.4-193.7	0
Mule Deer Migration Route	188.4-192.2	2.0 miles Northeast of ROW
Mule Deer Fawning Area	194.2	0.2 mile Northwest of ROW
Elk Calving Area	189.2-192.2	3.8 miles East of ROW
Mule Deer and Elk Migration Route	204.2-204.4	0
Elk Winter Range	207.0-219.6	0
Elk Migration Route	215.9-216.0	0
Mule Deer Winter Range	219.0-244.0	0
Elk Severe Winter Range	219.6-222.6	0
Elk Winter Concentration Area	222.6-233.0	0
Elk Winter Range	233.0-241.0	0
Elk Severe Winter Range	241.0-244.0	0
Mule Deer Winter Range	244.3-245.3	0
Elk Severe Winter Range	244.3-245.6	0
Mule Deer Summer Range	245.3-253.2	0
Elk Winter Range	245.6-256.1	0
Mule Deer Winter Range	253.2-265.1	0
Elk Severe Winter Range	256.1-259.3	0
Elk and Mule Deer Migration Route	257.3-270.3	0

TABLE 2-10 (CONTINUED)

Species/Habitat[1]	Milepost[2]	Distance from Right-of-Way[3]
Elk Winter Range	259.3-270.8	0
Mule Deer Severe winter Range	265.1-270.8	0
Mule Deer Crucial Habitat	270.8-286.6	0
Elk Crucial Habitat	270.8-286.6	0

[1]Important species habitat are those designated by management agencies, i.e., primarily Colorado Division of Wildlife and Bureau of Land Management and U.S. Forest Service.

[2]The length of important habitat crossed by the proposed or alternate routes is indicated by mileposts. Where important habitat is not crossed but is located nearby, a single milepost indicates the point on the pipeline route in closest proximity to the important habitat.

[3]Miles from ROW, 0 indicates that feature is located on ROW.

AGENCY PREFERRED ALTERNATIVE

Under the Agency Preferred Alternative, the TransColorado natural gas pipeline system would be constructed, operated, and maintained as described under the Proposed Action except for two routing changes (Figure 2-3 and on maps in the back of this document). The agency preferred pipeline route would be 290 miles long. As under the Proposed Action, the maximum design flow rate would be 300 MMcfd.

The Agency Preferred Alternative would result in a maximum disturbance of 2,693 acres during construction (including ROW, six new compressor station sites, and six meter station sites). Table 2-11 lists miles of ownership under private, state, and Federal ownership that would be crossed. The table indicates that 42 percent of the required ROW would be located on Federal lands, 4 percent would be located on state lands, and 54 percent would be located on private lands.

Construction

The construction, operation, maintenance, and abandonment processes would be the same as those described for the Proposed Action. Project facilities needed to support the pipeline are shown on Table 2-12 and Figure 2-3. Under the Agency Preferred Alternative, the route would parallel other pipelines and utilities for approximately 199 miles as opposed to 180 miles under the Proposed Action.

Pipeline Construction

Under the Agency Preferred Alternative, the pipeline would be 290 miles long. Of this total, 42 miles would be 22-inch diameter pipe and 248 miles would be 24-inch diameter pipe. The maximum design flow would be the same as that described under the Proposed Action (300 MMcfd). The clearing, grading, and trenching methods would be the same as those described under the Proposed Action.

Hydrostatic Testing

Hydrostatic testing would be done as described under the Proposed Action. Table 2-2 lists hydrostatic testing sources.

Cleanup and Restoration

Cleanup and restoration would be done as described under the Proposed Action. An estimated 4,140 cubic yards of solid waste would be generated.

Special Areas - Construction

Slopes

Slopes would be crossed as described under the Proposed Action. Three active landslide areas would be crossed under the Agency Preferred Alternative as opposed to five under the Proposed Action. Two locations on the Grand Mesa (same as Proposed Action) have active landslide areas. The other location is the Divide area between West Naturita Creek and Morrison Creek. Chapter 3, Table 3-2, gives a more detailed listing of landslide areas.

Roads and Railroad Crossings

As under the Proposed Action, crossings of railroads, interstate highways, state highways, and paved roads would be done by boring. A total of 2 major rail crossings would be made. Sixteen Federal highways and seven state highways would be crossed.

Irrigation Canal Crossings

Irrigation canals would be crossed as described under the Proposed Action. A total of 16 irrigation canals would be crossed.

River and Stream Crossings

As under the Proposed Action, five major rivers would be crossed. The rivers are the same as those listed for the Proposed Action. Four major streams would be crossed under the Agency Preferred Alternative as opposed to five under the Proposed Action, Table 2-13. Twelve cold water fisheries would be crossed.

Buried and Overhead Utility Crossings

Utility crossings would be done as described under the Proposed Action. A total of 11 major transmission lines and 5 major pipelines would be crossed.

Wetland Crossings

Wetland crossings would be done as described under the Proposed Action.

Natural Resource Requirements

Table 2-14 shows the natural resources that would be encountered by the Agency Preferred alternative.

Facilities Construction

Table 2-12 shows pipeline system components and design.

Compressor Stations

As under the Proposed Action, six compressor stations would be constructed and one existing compressor (Rocky Mountain-DeBeque) would be expanded. The locations of five of the compressors are known at this time. They are the Questar-Piceance Creek, WestGas-Meeker, WestGas-DeBeque, TransColorado-Olathe, and Rocky Mountain-Maverick. These five compressor sites are the same as those identified under the Proposed Action except for the Rocky Mountain-Maverick, which would replace the Proposed Action Rocky Mountain-Gypsum.

Three sites are being considered for the sixth compressor station under the Agency Preferred Alternative--Dolores, Dolores Alternate 1, and Dolores Alternate 2. These compressor sites are located in the Mancos Valley near the Mesa Verde National Park. The Dolores site is located approximately 6 miles northwest of the National Park boundary; Dolores Alternate 1 is located 21 miles from the National Park boundary; Dolores Alternate 2 is located approximately 11 miles northwest of the National Park boundary.

Table 2-15 shows the types of compressors that would be constructed under the Agency Preferred Alternative and the estimated pollutant volumes that would be emitted at each station.

Meter Stations

Six meter stations would be required as described under the Proposed Action.

Block Valves

Block valves would be required as described under the Proposed Action.

Pigging Facilities

Pigging facilities would be installed as described under the Proposed Action

Cathodic Stations

Cathodic stations would be installed as described under the Proposed Action.

Communication System

Communication systems would be installed as described under the Proposed Action

Infrastructure Requirements

Infrastructure requirements would be the same as these described under the Proposed Action except that 165 miles of existing roadways would be graded or improved as opposed to 199 miles under the Proposed Action.

Transportation Requirements

Transportation requirements would be the same as these described under the Proposed Action. State and Federal haul roads are shown on Table 3-8, Chapter 3.

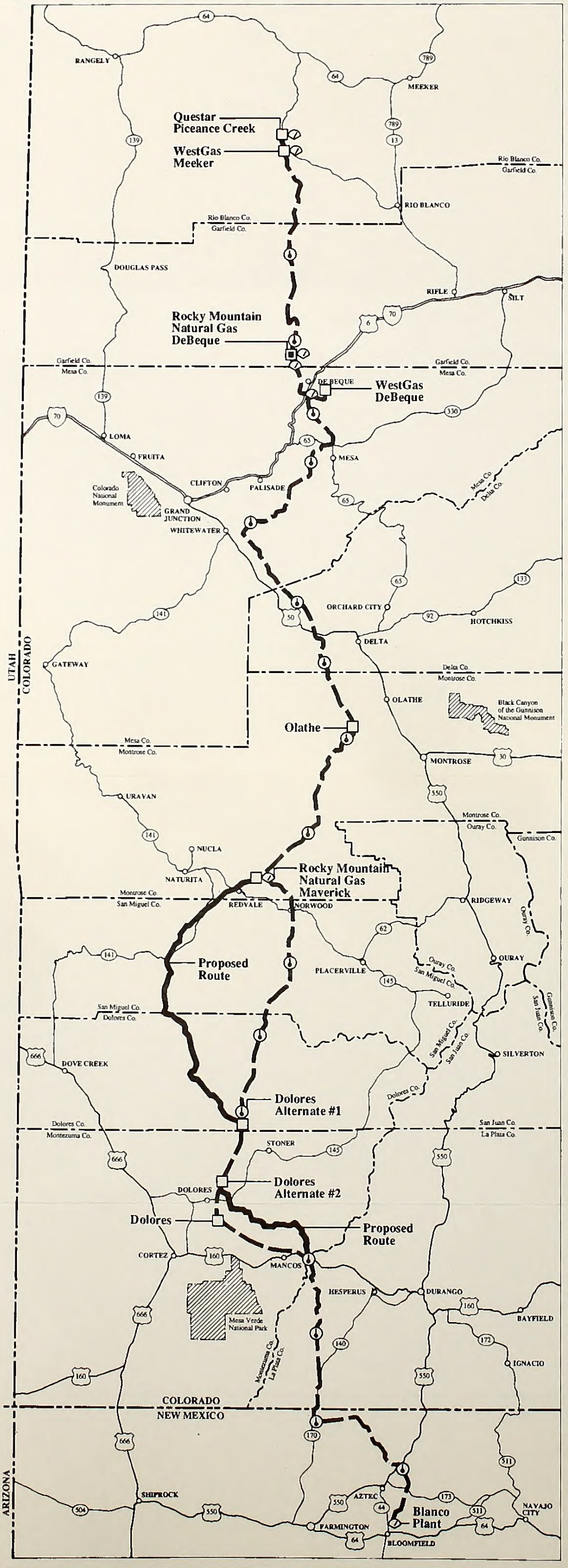
Word Force Requirements and Schedule

Operation and Maintenance

Operation and maintenance would be the same as that described under the Proposed Action.

AGENCY PREFERRED ROUTE

FIGURE 2-3



North 0 4 8 16 miles

- Existing Compressor Station, Pipeline Interconnection and Meter Station
- Proposed Compressor Station, Pipeline Interconnection and Meter Station
- Proposed Compressor Station
- Proposed Meter Station and Pipeline Interconnection
- Proposed Block Valve
- Proposed Route
- Agency Preferred Route

TRANSCOLORADO GAS TRANSMISSION PROJECT

TABLE 2-11

TransColorado Gas Transmission Project
Land Ownership and Parallel Facilities
Agency Preferred Alternative

Item	Units
Length (Miles)	290
Disturbance (total acres)	2,693
Ownership (percent)	
Private	54
BLM	30
Forest Service	12
State	4
Parallel Facilities	
Total Miles	199
Percent	69
Residences within 500 feet of ROW	66
Road Improvements (miles)	165
Existing Compressor Stations	1
Proposed Compressor Stations	6
Proposed Meter Stations	6
Proposed Block Valves	19

TABLE 2-12

TransColorado Gas Transmission Project
Pipeline System Components and Design Preferred
Agency Preferred Alternative

Component	Units or Length	Land Requirements Construction/Operation	Design
Pipeline	290 miles	75-ft. ROW/50-ft. ROW	248 miles of 22-inch and 42 miles of 24-inch-diameter pipe
	3 miles	75-ft. ROW/50-ft. ROW	8-inch diameter pipe
Compressor Stations	7	5-acre site (maximum, each site)	Buried and aboveground pipe, turbine compressors, gas coolers, control building, block value assembly, pigging (cleaning) apparatus
Electric Service Line	2.5 miles	Olathe Compressor Site	Standard
Electric Service Line	4 miles	Maverick Compressor Site	Standard
Dolores Alternate 2	3 miles	Electric Service Line	Standard
Dolores	0.3 mile	Electric Service Line	Standard
Meter Stations	6	0.25-acre site	Orifice plate, turbine meter, gas quality measuring equipment, piping and valves
Block Values	19	Contained within other sites or pipeline ROW	Sectionalizing values installed at 20-mile intervals
Pigging Facilities (cleaning)		Installed with compressor stations, meter stations, and block values	Facilities include traps and launchers
Cathodic Stations		Installed with compressor stations or within ROW	Facilities include power source, ground beds, rectifiers, and test leads
Communication System		Constructed at proposed compressor stations or sites operated by project partners	Towers, antennas, ancillary facilities

Source: TransColorado POD 1991.

TABLE 2-13

TransColorado Gas Transmission Project
Perennial Water Crossings

Approximate Milepost	Perennial Water Crossing	Approximate Width Traversed (feet)	Size of Crossing	High Water Quality Streams[1]	Cold Water Fisheries[2]
2.6	Piceance Creek	25	major stream		x
8.6	Willow Creek	5	minor stream		x
25.3	Crystal Creek	140	minor stream		
36.3	Conn Creek	30	minor stream		
44.3	Roan Creek	50	major stream		
47.4	Colorado River	375	major river		
59.4	Plateau Creek	70	major stream		x
105.4	Gunnison River	250	major river		x
105.6	Roubideau Creek	25	minor stream		
110.5	Roubideau Creek	25	minor stream		
143.5	Sheep Creek	15	minor stream		x
151.1	San Miguel River	80	major river		x
160.7	Maverick Draw	50	minor stream		x
178.2	Spectacle Creek	40	minor stream		x
182.4	Morrison Creek	10	minor stream		
183.9	Disappointment Creek	15	minor stream		
211.8	Dolores River	75	major river	x	x
214.0	Lost Canyon Creek	15	minor stream		
225.9	Chicken Creek	15	minor stream	x	x

Approximate Milepost	Perennial Water Crossing	Approximate Width Traversed (feet)	Size of Crossing	High Water Quality Streams[1]	Cold Water Fisheries[2]
228.4	West Mancos River	20	major stream	x	x
249.3	La Plata River	30	minor stream		
254.1	La Plata River	30	minor stream		
255.2	La Plata River	30	minor stream		
259.2	La Plata River	30	minor stream		
259.6	La Plata River	30	minor stream		
277.2	Animas River	150	major river	[3]	x

[1] High Water Quality Streams. Colorado: These streams are included in the High Quality Class II designation. These waters shall be maintained and protected at this existing quality unless lower quality is allowed by the state to accommodate important economic or social development.

[2] Cold Water Fisheries. Colorado: These are waters that 1) currently are capable of sustaining a wide variety of coldwater biota, including sensitive species; 2) could sustain such biota for correctable water quality conditions.

[3] The Animas River in New Mexico has been designated as suitable for irrigation, municipal supply, industrial supply, livestock watering, wildlife watering, marginal coldwater fishery, warm water fishery, and secondary contact recreation.

TABLE 2-14

TransColorado Gas Transmission Project
Occurrence of Natural Resources
Agency Preferred Alternative

	Agency Preferred Route
Paleontological Formations (miles)	16.6
Oil and Gas Fields (miles)	34
Strippable Coal (miles)	9
Oil Shale (<25 gallons/ton) Formations (miles)	0
Oil Shale (>25 gallons/ton) Formations (miles)	37
Major Rivers Crossed	5
Major Streams Crossed	4
Minor Streams Crossed	17
Wet Meadow/Hayland (miles)	1.4
Forested Wetland (miles)	1.5
Wet Shrubland Wetland (mile)	.1
Saline/Alkaline Soils (miles)	42
Rocky/Shallow/Wetland Soils (miles)	132
Steep Ascent/Descent Slopes (>15% <40%) (miles)	21
Steep Ascent/Descent Slopes (≥ 40%) (miles)	10
Steep Side Slopes (≥ 40%) (miles)	0
Active Landslide Areas (miles)	3
Landslide Deposits (miles)	27
Incised Channels (miles)	47
Potentially-Active Faults	3
Prime Farmlands (miles)	11
Farmlands of Statewide Importance (miles)	15
Agricultural Lands - All categories (miles)	35
Rangeland (miles)	166
Timber Land (miles)	17
Pinyon-Juniper (miles)	72.4
Livestock Allotments (AUMs)	226
Key Deer Range (miles)	96

TABLE 2-14 (Continued)

	Agency Preferred Route
Key Elk Range (miles)	81
Key Grouse Range (miles)	24
Key Antelope Range (miles)	2
Active Raptor Nests within 1.0 mile	4 nests
Bald Eagle Winter Range (miles)	66
Potential Black-Footed Ferret Habitat (miles)	18
Threatened and Endangered Plant Habitat (miles)	53
Cultural Resources: Projected Sites within 75-foot ROW	169
Cultural Resources: High Sensitivity Areas (miles)	174
Cultural Resources: Medium Sensitivity (miles)	68
Visual Contrasts (High) (miles)	40
Visual Contrasts (Moderate) (miles)	61

TABLE 2-15

TransColorado Gas Transmission Project Description of Compressor Stations and Estimates of Pollutants - Agency Preferred Alternative

Compressor Name and Location	Compressor Type and Horsepower	Estimated Emissions[1]		
		Nitrogen Oxides	Carbon Monoxide	Hydrocarbons
Questar-Piceance[2] MP 0	Centrifugal - 12,390 hp	174.00 (5.01)	15.60 (0.45)	8.10 (0.23)
WestGas-Meeker[3] MP 2.7	Reciprocating - 2,700 hp	57.00 (1.64)	83.00 (2.39)	54.00 (1.55)[4]
Rocky Mtn.-DeBeque MP 41.0	Reciprocating - 2,400 hp	254.91 (7.33)	32.44 (0.93)	101.96 (2.93)
WestGas-De Beque MP 48.5	Reciprocating - 5,100 hp	119.00 (3.42)	193.00 (5.55)	23.00 (0.66)[4]
TransColorado-Olathe MP 121.6	Centrifugal - 4,750 hp	90.75 (2.61)	6.67 (0.19)	0.26 (0.007)
Rocky Mtn-Maverick MP 151.7	Reciprocating - 800 hp	84.81 (2.44)	10.79 (0.31)	33.92 (0.98)
Dolores MP 215.2	Reciprocating - 5.400 hp	156.42 (4.50)	195.52 (5.62)	351.96 (10.14)
Dolores Alternate 1 MP 198.0	Reciprocating - 5,400 hp	156.42 (4.50)	195.52 (5.62)	351.96 (10.14)
Dolores Alternate 2 MP 209.8	Reciprocating - 5,400 hp	156.42 (4.50)	195.52 (5.62)	351.96 (10.14)

[1] Values in parentheses are emissions in grams per second. Emissions listed are based on total compressor engine horsepower at each site.

[2] Source: Questar Colorado State Air Quality Permit Application.

[3] Source: Western Gas Supply Company.

[4] Values are for non-methane hydrocarbons.

[5] Source: EPA's "Compilation of Air Pollutant Emission Factors: Volume I: Stationary Point and Area Sources" (AP-42).

[6] Source: Woodward-Clyde Consultants, "Environmental Report for the TransColorado Gas Transmission Company Natural Gas Transmission Pipeline."

Abandonment

Abandonment would be the same as that described under the Proposed Action.

Environmental Protection Measures

Environmental protection measures employed under the Agency Preferred Alternative would be the same as those described for the Proposed Action (see Table 2-7 and 2-8). Table 2-16 shows the wildlife species that would be protected under the Agency Preferred Alternative.

ROUTE DIFFERENCES - PROPOSED ACTION AND AGENCY PREFERRED ALTERNATIVE

As explained In the introduction to this chapter, the Proposed Action and the Agency Preferred Alternative routes differ in the Norwood area and in the Mancos Valley area (Figure 2-3 and maps in the back of this document).

Table 2-17 compares the two routes in the Norwood area, and Table 2-18 compares the two routes in the Mancos Valley area. The rationale for selection of the agency preferred route in these locations is provided below.

Rationale for Selection of Agency Preferred Route in the Norwood Area

In the Norwood area, the Federal agencies selected a route different than that proposed by TransColorado primarily because it would have fewer impacts on the natural resources. When comparing it to the proposed route, there are fewer incised channels, it is less prone to landslides and soil erosion, it disturbs less key big game range, it disturbs no saline soils, it is shorter, it has better access, it would require creation of fewer miles of utility corridor, and it has no endangered plant habitat.

Rationale for Selection of Agency Preferred Route in the Mancos Valley Area

In the Mancos Valley area, the Federal agencies selected a route different than that proposed by TransColorado primarily because it would have fewer impacts on the natural resources. In addition, the majority of the route would be within in an existing utility corridor as opposed to a new utility corridor. When comparing routes, the agency preferred route has fewer areas prone to landslides and soil erosion, fewer areas of steep slopes (greater than 40 percent), fewer crossings of wetlands, is shorter, is accessible from existing roads and has a history of construction impacts that can be predicted. It also follows existing corridors for its entire length which results in less disturbance to new area.

TABLE 2-16

TransColorado Gas Transmission Project
Recreationally and Economically Important Wildlife Species
Located in the Vicinity of the Agency Preferred Alternative

Species/Habitat[1]	Milepost[2]	Distance from Right-of-Way[3]
Mule Deer Severe Winter Range	0.0-6.3	0
Mule Deer Crucial Habitat	0.0-6.3	0
Elk Winter Range	10.0-18.0	0
Sage Grouse Nesting Area	14.5-19.0	0
Sage Grouse Lek	16.8	0.25 mile west of ROW
Sage Grouse Lek	17.0	0
Elk Crucial Habitat	18.0-32.5	0
Sage Grouse Nesting Area	23.5-30.0 26.0-30.0	0
Elk Winter Range	29-37.0	0
Sage Grouse Nesting Area	30.5-37.0	0
Sage Grouse Lek	32.8	200 feet south of ROW
Mule Deer Winter Concentration Area	34.5-47.5	0
Mule Deer Severe Winter Range	34.5-52.0	0
Mule Deer Crucial Habitat	34.5-52.0	0
Elk Winter Range	47.5-54.5	0
Elk Crucial Habitat	48.5-51.0	0
Elk Winter Concentration Area	48.5-52.0	0
Elk Severe Winter Range	48.5-51.0	0
Elk Migration Route	50.0-52.0	0
Elk Winter Range	58.0-72.0	0
Elk Crucial Habitat	60.0-61.0	0
Elk Winter Concentration Area	60.0-61.0	0
Elk Severe Winter Range	60.0-61.0	0
Mule Deer Winter Concentration Area	60.0-64.0	0
Mule Deer Crucial Habitat	60.0-62.5	0
Elk Winter Concentration Area	64.0-67.0	0
Elk Winter Range	73.0-77.0	0

TABLE 2-16 (CONTINUED)

Species/Habitat[1]	Milepost[2]	Distance from Right-of-Way[3]
Elk Crucial Habitat	75.0-76.5	0
Elk Severe Winter Range	75.0-76.5	0
Mule Deer Winter Concentration Area	75.0-78.0	0
Mule Deer Severe Winter Range	75.0-77.5	0
Mule Deer Crucial Habitat	75.0-77.5	0
Pronghorn Antelope Overall Range	83.2-103.9	0
Pronghorn Antelope Winter Range	87.2-103.9	0
Bighorn Sheep Overall Range	91.2-96.2	4.5 miles Southwest of ROW
Pronghorn Antelope Winter Concentration	100.2-102.2	1.4 miles West of ROW
Pronghorn Antelope Overall Range	106.2-112.3	0
Pronghorn Antelope Winter Range	106.2-112.3	0
Elk Winter Range	103.2-132.7	0
Elk Severe Winter Range	105.9-126.8	0
Mule Deer Winter Range	103.2-131.1	0
Mule Deer Severe Winter Range	105.9-126.9	0
Mule Deer and Elk Summer Range	131.1-142.9	0
Mule Deer Winter Range	142.8-193.9	0
Elk Winter Range	142.6-195.2	0
Mule Deer Winter Concentration Areas	147.4-150.4 153.2-157.4 160.2-174.2	0
Elk Calving Area	143.0-144.2	0
Elk Calving Area	144.2	0.3 mile Northwest of ROW
Elk Winter Concentration Area	147.4-150.2	0
Mule Deer Winter Range	151.7-171.9	0
Elk Winter Range	151.7-171.3	0
Sage Grouse Nesting Area	167.7-170.3	0
Sage Grouse Lek	169	0.4 mile East of ROW
Elk Summer Range	171.3-172.5	0
Mule Deer Summer Range	171.9-172.5	0
Sage Grouse Nesting Area	174.3	3.8 miles Northwest of ROW

TABLE 2-16 (CONTINUED)

Species/Habitat[1]	Milepost[2]	Distance from Right-of-Way[3]
Sage Grouse Nesting Area	175.3	2.5 miles Northwest of ROW
Sage Grouse Nesting Area	175.8	3.9 miles Northwest of ROW
Elk Winter Range	180.6-184.9	0
Elk Calving Area	184.3-186.3	2.0 miles West of ROW
Elk Calving Area	189.8-191.8	0.6 mile Northwest of ROW
Elk Winter Range	197.4-209.8	0
Elk Migration Route	206.2-206.3	
Mule Deer Winter Range	209.3-211.5	0
Elk Severe Winter Range	210.0-213.9	0
Mule Deer Winter Range	211.7-232.5	0
Mule Deer Severe Winter Range	222.7-224.1	0
Elk Winter Concentration Area	226.9-232.5	0
Elk Severe Winter Range	231.5-232.8	0
Mule Deer Summer Range	232.5-240.4	0
Elk Winter Range	232.8-243.4	0
Mule Deer Winter Range	240.4-252.3	0
Elk Severe Winter Range	243.3-246.5	0
Elk and Mule Deer Migration Route	244.5-257.5	0
Elk Winter Range	246.5-258.0	0
Mule Deer Severe winter Range	252.3-258.0	0
Mule Deer Crucial Habitat	258.0-273.8	0
Elk Crucial Habitat	258.0-273.8	0

[1]Important species habitat are those designated by management agencies, i.e., primarily Colorado Division of Wildlife, Bureau of Land Management, and U.S. Forest Service.

[2]The length of important habitat crossed by the proposed or alternate routes is indicated by mileposts. Where important habitat is not crossed but is located nearby, a single milepost indicates the point on the pipeline route in closest proximity to the important habitat.

[3]Miles from ROW, 0 indicates that feature is located on ROW.

TABLE 2-17

TransColorado Gas Transmission Project Route Differences
Proposed Route versus Agency Preferred Route
Norwood Area

	TransColorado Proposed Route	Agency Preferred Route
Length	58 miles	49 miles
Ownership-Private	34 percent	74 percent
Ownership - BLM	37 percent	8 percent
Ownership - National Forest	23 percent	10 percent
Ownership - State	6 percent	8 percent
Total Disturbance	527 acres	445 acres
Parallel Facilities	24 miles	24 miles
Road Improvements	36 miles	9 miles
Existing Compressor Stations	0	0
Proposed Compressor Stations	1	1
Proposed Meter Stations	1	1
Proposed Block Valve	4	4
Paleontological Formations	0	0
Oil and Gas Fields	1 mile	0
Strippable Coal	0	0
Oil Shale (<25 bbls/ton)	0	0
Oil Shale (>25 bbls/ton)	0	0
Major Rivers Crossed	0	0
Major Streams Crossed	0	0
Minor Streams Crossed	3	4
Wet Meadow/Hayland	5.3 acres	3.0 acres
Forested Wetland	0.5 acre	0.7 acre
Shrubland Wetland	4.0 acres	0.1 acre
Saline/Alkaline Soils	16 miles	0
Rocky/Shallow/Wetland Soils	13 miles	24 miles
Steep Ascent/Descent Slopes >15 percent <40 percent	4 miles	3 miles

TABLE 2-17 (CONTINUED)

	TransColorado Proposed Route	Agency Preferred Route
Steep Ascent/Descent Slopes ≥ 40 percent	3 miles	1 mile
Steep Side Slopes ≥ 40 percent	0.4 mile	0
Active Landslide Areas	1 mile	1 mile
Landslide Deposits	0	9.5 miles
Incised Channels	28.5 miles	0
Prime Farmlands	0	0
Farmland of Statewide Importance	0	2.4 miles
Agricultural Lands	1 mile	3.6 miles
Rangeland	38.7 miles	33.8 miles
Timber Lands	1 mile	4.2 miles
Pinyon Juniper	17.3 miles	7.4 miles
AUMs - Livestock	58 AUMs	49 AUMs
Key Deer Range	16.4 miles	0
Key Elk Range	27.7 miles	4 miles
Key Grouse Range	10 miles	6.6 miles
Key Antelope Range	0	0 miles
Historical Raptor Nests	2 nests	0
Bald Eagle Winter Range	36 miles	23 miles
Great Blue Heron Rookery	0	0
Potential Black-Footed Ferret Habitat	45 miles	3 miles
Threatened and Endangered Plant Habitat	10.5 miles	0
Cultural Resources Projected Sites within 75-foot ROW	14	56
Cultural Resources High Sensitivity Areas	42 miles	24 miles
Cultural Resources Medium Sensitivity Areas	8 miles	10 miles
Visual Contrasts (High)	8.5 miles	11 miles
Visual Contrasts (Moderate)	8.5 miles	16 miles
Irrigation Ditches	3	3
Major Rail Crossings	0	0

TABLE 2-17 (CONTINUED)

	TransColorado Proposed Route	Agency Preferred Route
Federal Highway Crossings	0	0
State Highway Crossings	3	1
Residences within 500 feet of ROW	7	6
Solid and Hazardous Waste	820 (cubic yards)	700 (cubic yards)

TABLE 2-18

TransColorado Gas Transmission Project
Route Differences - Proposed Route versus Agency Preferred Route
Mancos Area

	TransColorado Proposed Action	Agency Preferred Alternative
Length	34 miles	31 miles
Ownership-Private	29 percent	53 percent
Ownership - BLM	1 percent	6 percent
Ownership - National Forest	59 percent	36 percent
Ownership - State	11 percent	5 percent
Total Disturbance	309 acres	281 acres
Parallel Facilities	9.3 miles	28.5 miles
Road Improvements	15 miles	7.7 miles
Existing Compressor Stations	0	0
Proposed Compressor Stations	1	1
Proposed Meter Stations	0	0
Proposed Block Valves	2	2
Paleontological Formations	1 mile	0.5 mile
Oil and Gas Fields	0	0
Coal Bed Methane	0	0
Coal Formations	29 miles	24 miles
Strippable Coal	0	3
Oil Shale (<25 gallons/ton)	0	0
Oil Shale (>25 gallons/ton)	0	0
Major Rivers Crossed	1	1
Major Streams Crossed	2	1
Minor Streams Crossed	6	7
Wet Meadow/Hayland	2.7 acres	0.4 acre
Forested Wetland	1.2 acres	0.7 acre
Shrubland Wetland	0.6 acre	0.5 acre
Saline/Alkaline Soils	0	0
Rocky/Shallow/Wetland Soils	18 miles	19 miles

TABLE 2-18 (CONTINUED)

	TransColorado Proposed Action	Agency Preferred Alternative
Steep Ascent/Descent Slopes >15 percent <40 percent	1.7 miles	1.7 miles
Steep Ascent/Descent Slopes > 40 percent	4 miles	3.8 miles
Steep Side Slopes ≥ 40 percent	0	0
Landslide Areas	4 miles	1.5 miles
Incised Channels	0	9 miles
Prime Farmland	0.3 mile	2.2 mile
Farmland of Statewide Importance	0.3 mile	1.0 mile
Agricultural Lands	0.6 mile	3.2 miles
Rangeland	10.4 miles	9.8 miles
Timber Lands	23 miles	9 miles
Pinyon Juniper	0	12 miles
AUMs - Livestock	34 AUMs	31 AUMs
Key Deer Range	0	1.4 miles
Key Elk Range	16.4 miles	8.5 miles
Key Grouse Range	0	0
Key Antelope Range	0	0
Historical Raptor Nests	0	1
Bald Eagle Winter Range	2 miles	4.7 miles
Black-Footed Ferret Habitat	3 miles	3 miles
Threatened and Endangered Plant Habitat	0.5 mile	0
Cultural Resources Projected Sites within 75 foot-ROW	21	17
Cultural Resources High Sensitivity Areas	18 miles	9 miles
Cultural Resources Medium Sensitivity Areas	13 miles	21 miles
Visual Contrasts (High)	0 miles	6.7 miles
Visual Contrasts (Moderate)	2.5 miles	5.5 miles
Irrigation Ditches	7	2
Major Rail Crossings	0	0

TABLE 2-18 (CONTINUED)

	TransColorado Proposed Action	Agency Preferred Alternative
Federal Highway Crossings	0	2
State Highway Crossings	1	3
Residences within 500 feet of ROW	0	25
Solid and Hazardous Waste	480 (cubic yards)	440 (cubic yards)

NO ACTION ALTERNATIVE

Under the No Action Alternative, the TransColorado natural gas pipeline system would not be constructed. As described in Chapter 1, there are many current incentives for natural gas transmission companies to develop proposals to ship gas from the Rocky Mountain region to urban centers in California and the Midwest. It is anticipated that an alternate pipeline proposal would be presented to permitting agencies if the TransColorado pipeline is not built. Future demand for natural gas is subject to many factors, as outlined in the gas market discussion in Chapter 1. It is expected that the shut-in natural gas production capacity, combined with incentives from the Federal non-conventional energy program, would stimulate a proposal similar to that of TransColorado's or a pipeline system that would take gas from a portion of TransColorado's proposed service area.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Energy Conservation

Energy conservation offers opportunities for reduction of overall energy demand, and, in fact, energy conservation has been implemented in varying degrees and with varying amounts of success by utilities and industries throughout the country. However, because of increasing demands for cleaner air, natural gas is being used as a substitute for other hydrocarbon fuels. Even though active conservation could reduce overall energy demand, natural gas is expected to contribute a greater share to the overall energy mix in the foreseeable future. As a result, the demand for natural gas is not expected to be greatly diminished by any future government actions to reduce energy consumption.

Pipeline System Alternatives

A pipeline system alternative is defined as an alternative that would meet the stated objectives of the proposed project but would make use of an existing or modified pipeline delivery system. This would make it unnecessary to construct all or part of the proposed project. Although some modifications to an existing pipeline system, such as the addition of compression or pipeline loop, may be required to increase the capacity, the environmental impact associated with these additions could be less than the environmental impact associated with construction of an entirely new pipeline. The Northwest Pipeline Corporation system was evaluated as such an alternative to the TransColorado Project.

The Northwest System Alternative would involve the transportation of approximately 300 MMcfd of gas from Meeker, Colorado to Bloomfield, New Mexico. Specifically, this would entail the deliveries of gas by Questar (155 MMcfd), WestGas (70 MMcfd), and Rocky Mountain (75 MMcfd) to Northwest at various interconnections. To accomplish these deliveries, Questar would be required to construct its proposed Piceance Creek Compressor Station and to upgrade an existing 27.3 miles of 14-inch diameter pipe between Piceance Creek and Divide Creek. WestGas would need to construct 54.4 miles of 10-inch diameter pipe from DeBeque to West Douglas Creek, 14.2 miles of 8-inch diameter pipe from Meeker to Black Sulphur, and to install 2,500 hp of compression at DeBeque and 1,200 hp of compression at Meeker. Rocky Mountain would be required to construct 82.8 miles of 10-inch diameter pipeline loop from Colbran to the Piceance Creek Compressor Station, upgrade 86.3 miles of 10-inch diameter pipe between Slick Rock and Read Junction, and to install 3,600 hp of compression at Piceance Creek, 1,800 hp of compression at Colbran, and 600 hp of compression at DeBeque.

For Northwest to transport the approximate 300 MMcfd to Bloomfield, New Mexico, Northwest would be required to construct 303 miles of 30-inch pipeline looping on its mainline from the Rangely Compressor Station to Ignacio, Colorado, 48.3 miles of 20-inch pipeline looping on its Piceance Lateral from its Rangely Compressor Station to the Piceance Creek interconnect with

Questar, and to install 11,000 hp of compression at its La Plata Compressor Station.

In summary, the Northwest Pipeline System Alternative would require the construction of approximately 503 miles of pipeline compared to the 305 miles proposed by TransColorado, although most of the system alternative pipe would be looping. It should be noted that the 303 miles of pipe required to loop Northwest's mainline may be increased because two probable route variations would be necessary, one in order to avoid Arches National Park and Moab Canyon, and the other to avoid the planned Ridges Basin reservoir in La Plata County, Colorado. In addition to the pipe, this system alternative would require the installation of approximately 32,490 hp of compression compared to the 26,190 hp proposed for the TransColorado project, and all companies would be required to construct new meter stations and measuring facilities.

Due to the additional facilities required to construct the Northwest System Alternative and the fact that it does not offer any significant environmental advantage over the TransColorado project, this alternative has been eliminated from further consideration.

End Use Pipeline Alternatives

An end use pipeline alternative is defined as an existing or proposed pipeline system that could potentially deliver the equivalent of 300 MMcfd of natural gas proposed for transport by TransColorado to the same end use market areas in Southern California and the Midwest. The gas supplies for these projects are not the same as those identified for TransColorado, and these end use pipeline alternatives are considered in the draft EIS only on the basis that they meet the end use purpose of the TransColorado project. End use pipeline alternatives were identified for discussion in this draft EIS based on the following factors:

- The pipeline system is capable of transporting the 300 MMcfd, which is the proposed capacity of the TransColorado system.
- The pipeline system meets the end use purpose of the TransColorado pipeline (deliveries to Southern California or the Midwest).
- The pipeline system must be operating, be under construction, or have filed a currently active application for certification with the FERC.

The Kern River pipeline from Opal, Wyoming to Bakersfield, California, which is currently under construction, is the only pipeline system that could meet all of the criteria. However, the carrying capacity of the Kern River pipeline is already completely subscribed. In order for Kern River to transport the 300 MMcfd proposed for the TransColorado system, some presently undetermined amount of additional pipeline and compression facilities would be needed.

For purposes of comparison, the combination of the TransColorado pipeline with the Transwestern Mainline System Expansion would require approximately 598 miles of new pipeline; the combination of TransColorado with the El Paso Mainline and San Juan Triangle system would require 533 miles of new pipeline. These combined facility requirements are less than the 762 miles of new pipeline being constructed for the Kern River System. Although the additional facility requirements to carry TransColorado gas or the Kern River System are unknown it is expected that the land requirements for these additional Kern River facilities would likely equal or exceed those needed to construct the TransColorado system. Because of existing capacity constraints on the Kern River system, and because an expansion of the Kern River System does not appear to offer a significant environmental advantage over the TransColorado project, this alternative has been eliminated from further consideration.

SUMMARY OF IMPACTS

Table 2-19 compares the impacts of the Proposed Action with those of the Agency Preferred Alternative.

TABLE 2-19

TransColorado Gas Transmission Project
Summary Impact Comparisons between Proposed Action and Agency Preferred Alternative

	Proposed Action	Agency Preferred Alternative
Air Quality	Fuel combustion by pipeline construction equipment would increases the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 216 days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites. The daily fuel combustion emissions per mile from these activities are estimated to be equivalent to those emitted from a typical major urban street.	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 207 days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites. The daily fuel combustion emissions per mile from these activities are estimated to be equivalent to those emitted from a typical major urban street.
	Operation of seven compressor stations would increase the local (within 1 mile) concentrations of nitrogen dioxide and carbon monoxide. These increases would range from 2.3 times the annual average background levels for carbon monoxide to 11 times the annual average background levels for nitrogen dioxide. No pollutant concentration would exceed 50 percent of the applicable national air quality standard. Based on first-order, conservative screening analyses, both the Piceance Creek compressor station, and the Rocky Mountain DeBeque compressor station show a potential exceedance of the Prevention of Significant Deterioration (PSD) Class II nitrogen dioxide increment. Additional detailed, and more realistic modeling should show lower potential impacts. A plume visibility screening analysis indicates that operation of the Dolores Alternate 2 compressor station could cause plume visibility increases in nearby Mesa Verde National Park.	Operation of seven compressor stations would increase the local (within 1 mile) concentrations of nitrogen dioxide and carbon monoxide. These increases would range from 2.3 times the annual average background levels for carbon monoxide to 11 times the annual average background levels for nitrogen dioxide. No pollutant concentration would exceed 50 percent of the applicable national air quality standard. Based on first-order, conservative screening analyses, both the Piceance Creek compressor station, and the Rocky Mountain DeBeque compressor station show a potential exceedance of the Prevention of Significant Deterioration (PSD) Class II nitrogen dioxide increment. Additional detailed, and more realistic modeling should show lower potential impacts. A plume visibility screening analysis indicates that operation of the Dolores compressor station, or the Dolores Alternate 2 compressor station could cause plume visibility increases in nearby Mesa Verde National Park.
Topography	Natural slope contour would be changed on 11 acres in the Ryman Creek drainage in Dolores County, which represents less than 1 percent of the construction ROW area.	Natural slope contours would be changed on 0 acres.
Leasable Minerals	The proposed route would cross 0.1 mile of one active Federal coal lease in San Juan County, New Mexico, approximately 2 miles south of the Colorado/New Mexico border at Milepost 272.8. The proposed route would cross the lease corner, and would require an alternate pipeline realignment of 0.25 to 0.5 mile to the south to avoid this active lease. No potential conflicts with oil and gas development, and active oil shale leases were identified. Construction of the pipeline could cause future conflicts with mining operations on 1.5 square miles of underlying coal that could be surface-mined, and on 9.25 square miles of underlying oil shale potentially yielding 25 gallons per ton.	The proposed route would cross 0.1 mile of one active Federal coal lease in San Juan County, New Mexico, approximately 2 miles south of the Colorado/New Mexico border at Milepost 272.8. The proposed route would cross the lease corner, and would require an alternate pipeline realignment of 0.25 to 0.5 mile to the south to avoid this active lease. No potential conflicts with oil and gas development, and active oil shale leases were identified. Construction of the pipeline could cause future conflicts with mining operations on 2.25 square miles of underlying coal that could be surface-mined, and on 9.25 square miles of underlying oil shale potentially yielding 25 gallons per ton.

TABLE 2-19 (Continued)

	Proposed Action	Agency Preferred Alternative
Mineral Materials	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to an estimated 55 acres of unleased or privately owned mineral materials.	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to an estimated 55 acres of unleased or privately owned mineral materials.
Water Quality	Trenching, pipe laying, and backfilling in 5 major rivers, 5 major streams, and 17 minor perennial streams would increase suspended sediment for 1 to 5 days during the pipeline installation period.	Trenching, pipe laying, and backfilling in 5 major rivers, 4 major streams, and 17 minor perennial streams would increase suspended sediment for 1 to 5 days during the pipeline installation period.
Municipal Water Supplies	Clearing, grading, trenching, and backfilling 36 acres of ROW within the Palisade municipal watershed would slightly increase soil erosion, and slightly decrease the permeability of the ROW soils over the short term (1 to 3 years). The pipeline would avoid all spring clusters and intakes. Trenching across the Dolores River would slightly increase suspended sediment at the Dolores municipal water treatment plant intake for a period of 2 to 5 days.	Clearing, grading, trenching, and backfilling 36 acres of ROW within the Palisade municipal watershed would slightly increase soil erosion, and slightly decrease the permeability of ROW soils over the short term (1 to 3 years). The pipeline would avoid all spring clusters and intakes. Trenching across the Dolores River would slightly increase suspended sediment at the Dolores municipal water treatment plant intake for a period of 2 to 5 days.
Wetlands	Pipeline construction would decrease herbaceous vegetation cover on 13 acres of wet meadows/haylands for the short term; decrease shrub cover on 2 acres of shrub wetlands for the long term, and decrease shrub and tree cover on 14 acres of forested wetlands for the long term. Much less than 1 percent of the wetlands in any watershed would be disturbed by pipeline construction.	Pipeline construction would decrease herbaceous vegetation cover on 13 acres of wet meadows/haylands for the short-term; decrease shrub cover on 1 acre of shrub wetlands for the long term, and decrease shrub and tree cover on 14 acres of forested wetlands for the long term. Much less than 1 percent of the wetland in any watershed would be disturbed by pipeline construction.
Soils	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 1 to 5 years. Some increased erosion would be expected on the entire 2,802 acres. On areas of saline/alkaline soils (527 acres), steep (greater than 15 percent) slopes (336 acres), or shallow/rocky soils (1,090 acres) revegetation may be more difficult. Over the long-term, wind and water erosion losses and vegetation productivity losses from the pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction of the agency preferred route would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 1 to 5 years. Some increased erosion would be expected on the entire 2,693 acres. On areas of saline/alkaline soils (382 acres), steep (greater than 15 percent) slopes (282 acres), or shallow/rocky soils (1,200 acres), revegetation may be more difficult. Over the long-term, wind and water erosion losses are not expected to exceed those presently occurring on adjacent, undisturbed soils.

TABLE 2-19 (Continued)

	Proposed Action	Agency Preferred Alternative
Prime Farmland	Pipeline construction would decrease production on 82 acres of prime farmland and 109 acres of farmlands of statewide importance. A fraction of 1 percent of the farmland in any county crossed by the pipeline would be taken out of production for one growing season.	Pipeline construction would decrease production on 100 acres of prime farmland and 136 acres of farmland of statewide importance. A fraction of 1 percent of the farmlands in any county crossed by the pipeline would be taken out of production for one growing season.
Forestry	Pipeline construction would remove conifer and aspen timber resources and pinyon-juniper fuel wood/fencepost resources from 900 acres. These would be long-term impacts of approximately 11 percent of the timber, fuelwood, and fencepost annual harvest from adjacent public lands.	Pipeline construction would remove conifer and aspen timber resources and pinyon-juniper fuel wood/fencepost resources from 812 acres. These would be long-term impacts of approximately 10 percent of the annual timber, firewood, and fencepost harvest from adjacent public lands.
Livestock	Pipeline construction would decrease AUMs by 238 but would not reduce stocking rates in any allotments crossed.	Pipeline construction would decrease AUMs by 226 but would not reduce stocking rates in any allotments crossed.
Wildlife	Construction disturbance would decrease less than 1 percent of the surrounding key game ranges and vegetation types and would displace an unquantifiable number of animals. No regional population declines would result from pipeline construction for any species. A local population decline could occur for sage grouse utilizing the two leks that would be disturbed by construction activities.	Construction disturbance would decrease less than 1 percent of the surrounding key game ranges and vegetation types and would displace an unquantifiable number of animals. No regional population declines would result from pipeline construction for any species. A local population decline could occur for sage grouse utilizing the two leks that would be disturbed by construction activities.
Fisheries	Pipeline construction would result in short-term increases in sedimentation and short-term losses of stream bed substrate and biota in 15 Class I cold water rivers and streams and 12 Class II rivers and streams. The stream bed disturbance would result in very limited fish mortality and no loss of fishery quality or recreational opportunities.	Pipeline construction would result in short-term increases in sedimentation and short-term losses of stream bed substrate and biota in 12 Class I cold water rivers and streams and 14 Class II rivers and streams. The stream bed disturbance would result in very limited fish mortality and no loss of fishery quality or recreational opportunities.
Threatened and Endangered Species	Compliance with environmental protection measures included in Chapter 2 of this draft EIS would ensure protection of threatened and endangered species.	Compliance with environmental protection measures included in Chapter 2 of this draft EIS would ensure protection of threatened and endangered species.
Cultural Resources	The required Class III surveys and TransColorado's Programmatic Agreement would mitigate impacts to cultural resources and provide for data recovery where sites must be disturbed. Indirect impacts due to unauthorized collection of surface artifacts could decrease the value or significance of the sites.	The required Class III surveys and TransColorado's Programmatic Site Agreement would mitigate impacts to cultural resources and provide for data recovery where sites must be disturbed. Indirect impacts due to unauthorized collection of surface artifacts could decrease the value or significance of the sites.

TABLE 2-19 (Continued)

	Proposed Action	Agency Preferred Alternative
Native American Religious Values	Specific information on Native American traditional use and/or sacred sites on or near the route has not been received. Native American groups commonly do not wish to disclose the locations of these sites to the public. The BLM's archaeologists will continue to coordinate efforts with the affected tribes to identify these sites to assure their protection. Any site-specific information provided by tribal members will remain confidential. Disturbance of these traditional properties of Native Americans/ or indirect impacts due to unauthorized collection of surface artifacts would decrease the value or significance of the sites.	Specific information on Native American traditional use and/or sacred sites on or near the route has not been received. Native American groups commonly do not wish to disclose the locations of these sites to the public. The BLM's archaeologists will continue to coordinate efforts with the affected tribes to identify these sites to assure their protection. Any site-specific information provided by tribal members will remain confidential. Disturbance of these traditional properties of Native Americans/ or indirect impacts due to unauthorized collection of surface artifacts would decrease the value or significance of the sites.
Visual Resources	The Proposed Action would result in approximately 4.3 miles of high, short- and long-term visual resource decreases along the ROW and at four aboveground facility sites. These impacts would exceed the visual management objectives for these areas.	The Agency Preferred Alternative would result in approximately 10.4 miles of high, short- and long-term visual resource decreases along the ROW and at four aboveground facility sites. These impacts would exceed the visual management objectives for these areas.
Transportation	Construction would result in possible short-term traffic delays during road crossings and would require improvement or grading of 199 miles of dirt/gravel roads.	Construction would result in possible short-term traffic delays during road crossings and would require the improvement or grading of 165 miles of dirt/gravel roads.
Solid Waste Facilities	An estimated 4,300 cubic yards of construction-related solid waste would be generated and disposed of in licensed landfills.	An estimated 4,140 cubic yards of construction-related solid waste would be generated and disposed of in licensed landfills.

TABLE 2-19 (Continued)

	Proposed Action	Agency Preferred Alternative
Human Environment	Occupants of 42 residences would be exposed to short-term (2 to 3 weeks) increase in pipeline construction spread-related noise and fugitive dust. Crop production would be precluded on 273 acres for an estimated 2 years. Construction activities will result in employment of approximately 360 local workers and local expenditures of $5.8 million by local and non-local workers. Rental housing, motel/hotel, and RV accommodations for the construction labor force might not be adequate during the summer in the Durango area. Operation of the pipeline would yield approximately $4.2 million in first year property taxes, and $10,000 in ROW fees would be paid to Federal agencies for the first year. Based on current valuations, the annualized value of timber, fuel wood, and livestock forage removed from the ROW would represent approximately 11 percent of the annual Federal ROW fees. The value of crop production precluded on 273 acres for 2 years is estimated to be $44,800. Approximately 20 persons would be employed as operational staff. Payroll for this staff would result in local expenditures of approximately $219,000 annually for goods and services. Operation of the pipeline would increase the private land area committed to long-term utility uses by 787 acres. The combination of the TransColorado ROW with existing parallel ROWs would preclude installation of buildings on an average of 12 percent of the area of 15 small private land parcels (less than 20 acres) out of the 227 private land parcels that would be crossed. The Southern Utes would likely experience increased competition for sales of tribal natural gas if the TransColorado Pipeline were built. However, the extent to which this increased competition would affect sales is difficult to quantify because of uncertainties in estimating available gas supplies, future market prices, and future changes in pipeline capacity.	Construction of the pipeline would conflict with the Montezuma County resolution closing the existing Mancos Valley utility corridor to additional pipelines. Occupants of 66 residences would be exposed to short-term (2 to 3 weeks) increase in pipeline construction spread-related noise and fugitive dust. Crop production would be precluded on 318 acres for an estimated 2 years. Construction activities would result in employment of approximately 360 local workers and local expenditures of $5.8 million by local and non-local workers. Rental housing, motel/hotel, and RV accommodations for the construction labor force might not be adequate during the summer in the Durango area. Operation of the pipeline would yield approximately $4.0 million in first year property taxes, and $10,000 in ROW fees would be paid to Federal agencies for the first year. Based on current valuations, the annualized value of timber, fuel wood, and livestock forage removed from the ROW would represent approximately 11 percent of the annual Federal ROW fees. The value of crop production precluded on 318 acres for 2 years is estimated to be $52,200. Approximately 20 persons would be employed as operational staff. Payroll for this staff would result in local expenditures of approximately $219,000 annually for goods and services. Operation of the pipeline would increase the private land area committed to long-term utility uses by 949 acres. The combination of the TransColorado ROW with existing parallel ROWs would preclude installation of buildings on an average of 16 percent of the area of 21 small private land parcels (less than 20 acres) out of the 265 private parcels that would be crossed. The Southern Utes would likely experience increased competition for sales of tribal natural gas if the TransColorado Pipeline were built. However, the extent to which this increased competition would affect sales is difficult to quantify because of uncertainties in estimating available gas supplies, future market prices, and future changes in pipeline capacity.
Public Safety	Operation of the pipeline would result in an estimated fatality rate of 1 death for every 410 years of operation, based on the incident rates reported for the entire U.S. for the 1970-1984 period.	Operation of the pipeline would result in an estimated fatality rate of 1 death for every 426 years of operation, based on the incident rates for the entire U.S for 1970-1984 period.

CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

Chapter 3 is a summary of the affected environment for all resources potentially affected by the Proposed Action and Agency Preferred Alternative. These resources are addressed, based on the Issues identified through the formal public scoping process. The affected environment Is a baseline for each discipline and describes the current conditions prior to and in absence of the Proposed Action. All specific baseline data related to route variations of the project are presented in Appendix B.

CLIMATE

The climate of western Colorado and northwestern New Mexico can generally be classified as varying from arid to highland. The area is characterized by light precipitation, low relative humidity, abundant sunshine, and large annual and diurnal temperature ranges.

Climatological data representative of this region are presented in Table 3-1. January temperatures range from average daily minimums in the teens to average daily maximums near 40°F. Daily minimum temperatures in July range from the 50s to mid 60s, while daily maximums average in the high 80s to low 90s. A high frequency of clear skies and low relative humidity in the region provides for rapid nighttime cooling. The average diurnal range between maximum and minimum temperatures is from 25 to 40°F.

Growing seasons (killing frost to killing frost) are generally the longest at lower elevations. The longest growing seasons occur in the Grand Valley In Mesa County (185 days), and shortest (less than 1 day) are at elevations above 7,000 feet on the Roan Plateau in Rio Blanco and Garfield Counties, Uncompahgre Plateau in Montrose and San Miguel Counties, and the west and south sides of the San Juan and La Plata Mountains In Dolores and Montezuma Counties, Colorado.

Average annual precipitation ranges from 8 to 18 inches in this region. The variability in precipitation is mainly a function of elevation. Higher elevations receive more precipitation than valleys and lower elevations. In western Colorado, the winter months tend to be the wettest while June is one of the driest. Snowfall across the pipeline route ranges from an annual average of nearly 20 inches in the lower valleys to nearly 100 Inches in the higher elevations. The greatest monthly amounts of precipitation occur in the winter months, caused mainly by frontal activity associated with easterly movement of Pacific Ocean storms. In northwestern New Mexico, wettest months occur in the fall, with June and the winter months being drier.

AIR QUALITY

The primarily rural regions of western Colorado through which the pipeline would cross are designated as Environmental Protection Agency (EPA) attainment areas for all criteria pollutants. Air quality in the region where most of the proposed route and agency preferred routes would pass and where proposed compressor stations are located is good because of the general lack of industrial activity in rural regions.

The major regional sources of regulated air pollutants include coal-fired power plants in the Yampa River Valley near Craig and Hayden, Colorado; the Cameo Power Plant near Palisade, Colorado; and the Four Corners and San Juan Generating Station near Fruitland, New Mexico. Other industrial sources include natural gas compressor stations and oil refineries. A small oil refinery is located near Fruita, Colorado. Natural gas compressor stations in Colorado are located at various locations in the Piceance Basin in Rio Blanco and Garfield Counties; the Plateau Creek area of Mesa County; the Paradox Basin area in San Miguel and Dolores Counties; and the northern San Juan Basin near Durango. In New Mexico, compressor stations are located In the San Juan Basin near Farmington and Bloomfield.

TABLE 3-1

TransColorado Gas Transmission Project
Summary of Temperature and Precipitation Data in Western Colorado[1] and Northwestern New Mexico

	January Mean Temperature (°F)		July Mean Temperature (°F)		Annual Precipitation (inches)	Growing Season Range Number of Days between Minimums of:	
	Minimum	Maximum	Minimum	Maximum		32°	24°
Meeker	7	37	48	86	17.5	91	143
Grand Junction	17	37	65	93	8.2	185	230
Norwood	10	36	49	83	14.3	NA	NA
Cortez	14	41	55	89	12.5	126	180
Durango	11	43	50	87	18.6	96	146
Aztec Ruins National Monument, NM[2]	13	38	57	91	9.8	147	190

Source: NOAA 1974.

[1]Period of Record: 1951-1970.

[2]Approximately 15 miles northeast of Farmington, NM,

Ambient levels for gaseous pollutants were not exceeded during the data collection period from 1957 to 1970. Standards for total suspended particulates and PM-10, are occasionally exceeded; however, these violations usually occur in small towns as a result of woodburning and road sanding activities (Woodward-Clyde [WCC] 1990). Representative air quality data for the rural areas in western Colorado through which the pipeline would pass were collected at the Chevron Tract Oil Shale Reserve near Rifle, Colorado from October 1980 through September 1981. Carbon monoxide (CO) had a peak 1-hour concentration during that period of 5,405 $\mu g/m^3$. The annual average concentration was 115 $\mu g/m^3$. Nitrogen dioxide (NO_2) averaged 3.8 $\mu g/m^3$ for the 1-year period.

The region through which most of the proposed route and agency preferred routes would pass is designated as a Class II Prevention of Significant Deterioration (PSD) area. Class II PSD areas are allowed moderate deterioration of present conditions if they are in attainment status. The Lizard Head Wilderness is approximately 12 miles away from the proposed route. This is a Class II PSD area. The proposed route and the agency preferred route pass within 6 miles of Mesa Verde National Park, a Class I PSD area.

In recent presentations to various regulatory agencies (National Park Service 1985, National Park Service 1987), the National Park Service (NPS) has expressed concerns about existing, and future visibility impairment on Mesa Verde National Park as a result of man-made pollution. In addition to sulfates and other particulate matter, the NPS believes that nitrogen dioxide (NO_2) is a major contributor to visible plumes from industrial sources, and that NO_2 and nitrate (NO_3) from these sources may contribute to regional haze. The NPS has been collecting visibility data at Mesa Verde National Park, and certified to EPA in 1985 that there is significant visibility impairment at Mesa Verde National Park. Considering the Clean Air Act requirements that reasonable progress be made toward the national goal "of remedying existing and preventing future man-made visibility impairment in mandatory (PSD) Class I areas," any perceptible visibility impairment from this station may be considered unacceptable by the National Park Service.

TOPOGRAPHY

The topography varies from level, gently sloping valley floors to flat mesa tops. Canyons dissect the land for the entire length of the route. These canyons vary from wide, gently sloping to steep, narrow, V-shaped canyons. The Roan Cliffs and Book Cliffs, between Roan Creek and DeBeque, are shale cliffs that have sheer faces as high as 1,500 feet. The route skirts the Grand Mesa, which is the largest flat-topped mountain in the world.

Steep slopes are defined as those 15 percent or greater. Maximum slopes found along the pipeline routes exceed 60 percent. Steep slopes (0.1 mile in length or more) were analyzed for all routes. Steep slopes are encountered throughout the project area, but primarily occur where the pipeline routes would cross incised drainages and steep canyons associated with the Roan Plateau, Uncompahgre Plateau, Paradox Basin, and La Plata Mountains. Figure 3-1, located at the end of this chapter, illustrates the location of slopes greater than 15 percent and Tables 2-4 and 2-14 (Chapter 2) indicate that 37 miles of steep slopes would be crossed by the proposed route and 31 miles of steep slopes would be crossed by the agency preferred route.

Several geologic hazards were reviewed as potential concerns to the proposed and agency preferred routes. These hazards are: landslides, incised drainages, and seismicity (including active faults, earthquakes, and soil liquefaction).

The proposed and agency preferred routes would cross areas that have documented landslide incidents or areas that have a moderate to high landslide susceptibility (Radbruch-Hall et al. 1976). Landslide hazards may include slumping, mass movement of large blocks, or debris flows. In order to adequately define the potential landslide hazard, published sources were consulted as well as recent aerial photography. In high hazard areas, field reconnaissance was conducted to confirm the existence of slides indicated by aerial photography. Table 3-2 is a listing of landslides encountered along the routes. Tables 2-4 and 2-14 indicate 4 miles of active landslide areas and 17 miles of landslide deposits are crossed by the proposed route and 3 miles of active landslide areas and 27 miles of landslide deposits are

TABLE 3-2

TransColorado Gas Transmission Project
Landslide Features and Potentially Active Faults
Crossed by Proposed and Agency Preferred Routes

Milepost	Total Miles	Feature	Location
Proposed Route			
65.0 - 70.0	5	Landslide deposits[1]	Grand Mesa
70.0 - 71.0	1	Active landslide area[2]	Grand Mesa
71.0 - 72.5	1.5	Landslide deposits[1]	Grand Mesa
72.5 - 73.2	0.7	Active landslide area[2]	Grand Mesa
73.2 - 75.0	1.8	Landslide deposits[1]	Grand Mesa
140.0 - 148.0	8	Landslide deposits[1]	Patterson Mountain area
195.0 - 196.0	1	Active landslide	Ryman Creek Divide area
133.0	0.1	Potentially active fault	Near Oak Hill
143.0	0.1	Potentially active fault	Near Sheep Creek
147.0	0.1	Potentially active fault	Near Patterson Mountain
234.6 - 235.2	0.6	Active landslide area[2]	Chicken Creek
237.1 - 237.7	0.5	Active landslide area[2]	West Mancos River
Agency Preferred Route			
65.0 - 70.0	5	Landslide deposits[1]	Grand Mesa
70.0 - 71.0	1	Active landslide area[2]	Grand Mesa
71.0 - 72.5	1.5	Landslide deposits[1]	Grand Mesa
72.5 - 73.2	0.7	Active landslide area[2]	Grand Mesa
73.2 - 75.0	1.8	Landslide deposits[1]	Grand Mesa
133.0	0.1	Potentially active fault	Near Oak Hill
143.0	0.1	Potentially active fault	Near Sheep Creek
147.0	0.1	Potentially active fault	Near Patterson Mountain
140.0-148.0	8	Landslide deposits[1]	Patterson Mountain Area
172.8-180.8	8	Landslide deposits[1]	Northwest of Lone Cone
180.8-181.8	1	Active landslide area[2]	Divide between West Naturita Creek and Morrison Creek (tributary to Disappointment Creek)

TABLE 3-2 (CONTINUED)

Milepost	Total Miles	Feature	Location
191.8-193.2	1.5	Landslide deposit	Beaver Mountain
228.3-229.3	1	Potential debris flow path	East of Mancos

[1]Landslide deposits: areas underlain by landslide debris which do not show evidence of recent movement. These areas represent low risk for impacts from pipeline construction.

[2]Active landslide areas: these areas show evidence of recent landslide movement based upon field observation of disrupted vegetation (i.e., leaning trees, exposed scarps). These areas represent a high risk for impacts from pipeline construction and may require special mitigation measures.

crossed by the agency preferred route. Figure 3-2, located at the end of this chapter, shows landslide areas.

Incised channels were also considered a potential hazard for the proposed and agency preferred routes. Figure 3-2 and Tables 2-4 and 2-14 depict that 66 miles of incised channels are crossed by the proposed route and 47 miles by the preferred route. Aerial photographs and topographic maps were used to delineate areas of possible hazard. Field checks were also conducted in the fall of 1990. Drainage areas were evaluated based on the observation of ongoing incision, the frequency of incised channels, and the degree of incision or erosion. Areas along the proposed route where young, actively down-cutting incised channels may prevent stabilization problems include the Roan Creek drainage (MP 37 to MP 42); and the Ryman Creek drainage (MP 185 to MP 195); the agency preferred route would be the same as the proposed route except that the Ryman Creek segment would be avoided.

Although the area that would be crossed by the proposed and agency preferred routes is not generally considered one of intense seismic activity (Stover et al. 1988), several relatively low-magnitude earthquakes have been recorded in the region in recent times. The nearest recorded earthquake measured a Richter scale magnitude of 4.0 near MP 162 along the preferred route.

The number of potentially active faults is listed on Tables 2-4 and 2-14 and illustrated on Figure 3-2. For purposes of pipeline construction, the Federal Energy Regulatory Commission (FERC 1988) has defined active faults as "those in which displacement is evident in Holocene deposits." The faults along the proposed route cannot be classified as active under this definition, until the offset of Holocene deposits can be demonstrated. However, the lack of evidence does not preclude the potential for movement along these faults. There are three potentially active faults on either route.

Soil liquefaction is a phenomenon associated with earthquakes. Under certain conditions, soils may lose their ability to support structures during earthquake events; soil liquefaction is a major cause of earthquake damage (Youd and Perkins 1987). Soil liquefaction can result from a combination of factors: soil type, soil saturation, and amount of horizontal ground acceleration from an earthquake. The soil liquefaction potential is low in areas that would be crossed by the proposed and agency preferred routes because horizontal ground accelerations expected from a maximum credible earthquake are not expected to be severe enough for liquefaction to occur (Algermissen et al. 1982).

LEASABLE MINERALS

The proposed route would cross areas underlain by leasable minerals including conventional oil and gas, coal, oil shale, and coal bed methane. The areas that contain leasable minerals are displayed on Figure 3-3, located at the end of this chapter.

Oil and Gas

The proposed and agency preferred routes would cross a number of oil and gas fields and travel adjacent to several producing areas (Scanlon 1983; Finch et al. 1989). Most of the oil and gas fields are in the Piceance Basin or in the San Juan Basin. A few fields that would be crossed are in the Paradox Basin and Four Corners Platform. The miles of oil and gas fields crossed are presented in Tables 2-2 and 2-10; 35 miles are crossed by the proposed route and 34 miles by the agency preferred route; locations and names are illustrated on Figure 3-3.

The Piceance Basin is primarily a gas production area (Mallory 1972). Oil is of secondary importance, but is produced from the same formations that produce gas (BLM 1984a). Oil and gas reservoirs occur in the Morrison Formation, Dakota Sandstone, Mancos Formation, Mesaverde Group, Wasatch Formation, and the Green River Formation. The Piceance Creek Field produces gas from the Green River and Wasatch Formations.

The San Juan Basin is the other major oil and gas production basin that would be crossed by the proposed and agency preferred routes. Production from the basin is mainly from the Entrada Sandstone, Dakota Sandstone, Gallup Sandstone, Mesaverde Group, Pictured Cliffs Sandstone, and the Fruitland Formation (Finch et al. 1989). Conventional gas reservoirs have

produced about 17 trillion cubic feet (TCF) of gas and, ultimately, production should reach 29 TCF.

The Four Corners Platform is located northwest of the central part of the San Juan Basin. Structurally, the area is distinct from the basin, but generally production from the platform is included with the rest of the basin. The Four Corners Platform produces oil from the Dakota and Mesaverde Formations and gas from the Paradox Formation (Mallory 1972). The Paradox Basin is a northwest- to southeast-trending area that covers about 19,000 square miles. The complex geology of the basin has made exploration difficult, and the Paradox Basin remains secondary to the Piceance and San Juan Basins in terms of oil and gas resources.

Coal Bed Methane

The San Juan Basin and the Piceance Basin are of major importance in unconventional natural gas resources. Development of coal bed methane gas has become an important activity in the last 10 years, especially in the San Juan Basin. The natural process that turns organic material into coal results in methane that is trapped in the coal seams (Tremain 1984). Normally, trapped methane is a hazard during underground coal mining, but in areas where coal is too deep to be mined economically, the methane is becoming an attractive exploration target. The proposed and agency preferred routes cross 35 miles of coal bed methane resources. Figure 3-3 depicts areas of coal bed methane resources that would be crossed by the proposed and agency preferred routes.

In the Piceance Basin, the Mesaverde Group contains coal beds that have high potential for coal bed methane production. The aggregate thickness of the coal beds in the Mesaverde is up to 200 feet (Tremain 1984). These coal seams can be as much as 9,000 feet deep. The coal bed methane potential of the Piceance Basin is considerable. As much as 84 TCF could be trapped in the coal of the basin, many times more than the conventional gas that has been produced in the basin to date (Kuuskraa and Brandenburg 1989).

In the San Juan Basin, the most favorable coal bed methane formations are the Fruitland Formation and the Menefee Formation (Rightmire et al. 1984). The methane resource in the Fruitland is estimated to be 50 TCF, which is more than the conventional gas reservoir resource in the San Juan Basin (Kuuskraa and Brandenburg 1989). The potential of the Menefee Formation is 38 TCF, but it remains of secondary importance to the Fruitland Formation. As of 1989, proven methane reserves of the Fruitland were estimated at 0.9 TCF.

Oil Shale

In the Piceance Basin, the proposed and agency preferred routes would cross the Green River Formation, which contains potentially large reserves of oil shale. The Piceance Basin may contain as much as 960 billion barrels of oil (BLM 1984a). Figure 3-3 illustrates the locations of the richest oil shale deposits and is based on a yield of equal to or greater than 25 barrels of oil per ton (Murray 1976). Tables 2-4 and 2-14 indicate the proposed and agency preferred routes cross 37 miles of high-grade oil shale deposits.

Coal

The proposed and agency preferred routes cross portions of the Piceance, Paradox, and San Juan coal-bearing basins. Coal-bearing strata are also present in areas of the Uncompahgre Uplift and Four Corners Platform traversed by the pipeline route (Mallory 1972). Much of the coal in these areas is deeply buried and recovery is not economically feasible, although several coal fields with economic potential do exist. Coal in the Grand Mesa and Book Cliffs coal fields of the Piceance Basin occurs in the Upper Cretaceous Mesaverde Formation. Coal fields that would be traversed by the proposed and agency preferred routes in the Uncompahgre Uplift, the Paradox Basin, and the San Juan Basin are also hosted in Upper Cretaceous rocks. In the Paradox Basin, the Tongue Mesa field occurs in the Dakota and Fruitland-Kirkland Formations, and the Nucla-Naturita field has coal in the Dakota Formation. The Durango field in the San Juan Basin contains coal in Dakota, Menefee, and Fruitland Formations (Jones et al. 1978).

Although much of the area crossed would contain potential coal resources, there are few areas where information concerning recoverable reserves is available. According to the U.S.

Bureau of Mines (Cochran 1991), coal reserve information is site-specific, and there is no regional coal reserve data base for the areas crossed by proposed and preferred routes.

The preferred route would cross an area where strippable reserves have been delineated in the Cortez Dakota Field. Shomaker (1971) estimated strippable reserves at 123.8 million tons from Dakota Coal in an area bounded by Township 36 North, Ranges 15 and 16 West. Figure 3-3 shows the locations of these areas of strippable reserves where crossed. Tables 2-4 and 2-14 indicate the proposed route would cross 6 miles of strippable reserves and the agency preferred route would cross 9 miles of these reserves. These reserves are not currently under lease.

A minerals lease status investigation was conducted in the Bureau of Land Management Colorado state office to determine whether the proposed or agency preferred routes would cross coal currently under lease. The Bureau of Mines was also contacted as part of this investigation (Stone 1991). No project conflicts with coal lands currently under lease in Colorado were identified.

The BLM in Farmington, New Mexico (Yost 1991) performed a comparable survey for lands crossed by the various pipeline routes in New Mexico. It was found that the proposed route would cross 0.1 mile of the southwest corner of the La Plata Mine coal lease at MP 272.8 in San Juan County, New Mexico. A pipeline realignment of 0.25 to 0.5 mile to the south would avoid this active lease.

MINERAL MATERIALS

Sand and gravel deposits may be encountered in alluvial deposits adjacent to streams or on terraces above incised valleys. Sand and gravel quarrying operations exist near the proposed and agency preferred routes. Figure 3-3, located at the end of this chapter, shows the location of sand and gravel quarries. In Colorado, quarries were located by using maps published by the Colorado Geological Survey (Schwochow 1981). It was not determined whether quarries were active. In New Mexico, topographic maps were used to locate sand and gravel operations near the proposed route and agency preferred route. No sand and gravel quarries were found along or near these areas. There are seven mineral material quarries within 0.25 mile of the proposed route and eight within 0.25 mile of the agency preferred route.

WATER QUALITY AND QUANTITY

Surface Water

Major River Basins

Six major drainage basins are crossed by the proposed route and agency preferred route. They are: the White, Colorado, Gunnison, San Miguel, Dolores, Animas, and San Juan River Basins.

Colorado and New Mexico Water Quality Classifications

The State of Colorado has established stream classifications and associated water quality standards based on considerations of public health, water supplies, recreation, and protection of aquatic life. Appendix C provides applicable water quality classifications for the major rivers and perennial streams crossed by the proposed route and agency preferred route in Colorado.

The State of New Mexico has established stream classifications and associated water quality standards for surface water bodies across the state. Appendix C provides applicable water quality classifications for the major rivers that would be crossed by the proposed or agency preferred routes in New Mexico.

River and Stream Crossings

The proposed route and the agency preferred route for the TransColorado Pipeline would each cross five major rivers, the Colorado, Gunnison, San Miguel, Dolores, and Animas. Five major streams (Piceance Creek, Roan Creek, Plateau Creek, West Mancos River, Middle Mancos River) would be crossed by the proposed route and four (Piceance Creek, Roan Creek, Plateau Creek, West Mancos River) by the Agency Preferred. Appendix C, Tables C-1 and C-2 list the rivers, streams, and wetlands that would be crossed by

the proposed route and agency preferred route. Applicable water quality classifications are also provided in Appendix C.

Four rivers and one smaller stream crossed by the proposed route and the agency preferred route are designated as High Quality, Class 2. The Dolores; West, Middle, and East Mancos Rivers; and Chicken Creek, are designated as waters that shall be maintained (unless exempted) at their existing water quality. Class 2 waters may not be degraded under any circumstances in a way that would interfere with or become injurious to existing classified uses.

Tables C-1 and C-2 list channel widths and substrate conditions, where known. Substrate types at the crossing locations are dependent on local geologic conditions, flow rates, and topography. The rivers crossed by the proposed and agency preferred routes are anticipated to have either sand and silt or gravel, rubble, boulder beds. Perennial stream banks and channels are anticipated to be stable where riparian vegetation is established.

Municipal Watersheds and Water Supplies

The proposed and agency preferred routes would cross watersheds on the north and west sides of Grand Mesa that supply water to the towns of Palisade, Grand Junction, Clifton, and Whitewater. Two municipal water supply wells are located within 0.25 mile of the routes. The following is a description of the physical characteristics of these water supply systems and wells, and the placement of the pipeline routes in relation to these systems. Other municipal water supply canals and pipelines are discussed under Other Facilities.

Palisade Municipal Water Supply

The town of Palisade, Colorado, is located at the mouth of DeBeque Canyon where the Colorado River enters Grand Valley. The town obtains water from the Rapid Creek Basin, which drains the northwest flank of Grand Mesa, and from Kruzen Springs located just below Palisade Point at the western end of Grand Mesa. Water is diverted from several springs in the upper portion of Rapid Creek and Cottonwood Creek, a major tributary of Rapid Creek, to several reservoirs (Brooks 1986). Water is then piped from the reservoirs or directly from springs down the watershed to a treatment plant for subsequent delivery to the town.

The Palisade watershed is comprised of a mixture of public and private lands. The BLM has developed a planned management action for municipal watershed protection to, "Limit surface-disturbing activities in the Palisade and Grand Junction municipal watersheds..." (BLM 1987c) and to ensure that no surface occupancy will be allowed on slopes greater than 40 percent. The primary objectives of these measures are to minimize the erosion potential within these watersheds. Chapter 1 and Chapter 2 of this document provide additional discussion of the Grand Junction Resource Management Plan (RMP) and its associated protection measures.

The occurrence of springs in the Rapid Creek watershed is a direct function of the geology of the basin. The top surface and the slopes of Grand Mesa are underlain (starting from the top) by a sequence of glacial till, basalt, Tertiary age sediments, and Cretaceous age sediments. Due to the structural weakness of the sediments underlying the mesa, a number of failures have occurred along the flanks of the mesa initiating as slump failures and then continuing downslope as earth flows or mud flows, depositing a mantle of landslide debris on the upper slopes of the mesa (Yeend 1969). About 45 percent of the Rapid Creek watershed is underlain by landslide deposits. All the springs within the Rapid Creek Basin occur in the landslide deposits with the largest of the springs issuing from the downstream edge of the deposits.

The glacial till that occurs as a thin veneer over the basalt caprock of the mesa is relatively impermeable (Brooks 1986), causing most of the precipitation that falls on the top of the mesa to run off as stream flow or to collect in reservoirs. The basalt is also relatively impermeable, thus impeding the infiltration and subsequent flow of groundwater into the underlying sedimentary rocks.

The landslide debris is an unconsolidated deposit composed of blocks of basalt and broken rubble of the underlying sedimentary rocks. Consequently, the debris is likely to have a

variable permeability, although it is expected to be fairly high, perhaps approximately two to three orders of magnitude higher than the underlying sedimentary rock (Brooks 1986). Due to the great difference in permeability between the landslide deposits and the underlying rocks, it is unlikely that there is significant flow of groundwater between the two. Therefore, the water that occurs in the landslide deposits is derived primarily from infiltration of direct precipitation. According to Brooks (1986), precipitation that falls on the landslide deposits infiltrates to the contact with the less permeable underlying bedrock, moves laterally downhill through the deposit, and discharges to springs near the lower boundary of the landslide deposits.

The proposed route and the agency preferred route would cross the Rapid Creek Basin through the area underlain by the landslide deposits. The length of the Routes in this basin is roughly 4.2 miles and would pass approximately 0.25 mile and 160 vertical feet below Kruzen Springs.

Grand Junction Water Supply

The city of Grand Junction, Colorado obtains water from the Kannah and North Kannah Creek watersheds, which drain the southwest flank of Grand Mesa. Water is stored in reservoirs and delivered via pipeline to a filtration plant located about 3.5 miles northwest of Whitewater. The water system for Grand Junction also supplies water to the towns of Clifton and Whitewater. Landslide deposits occur in the headwaters of Kannah and North Kannah Creeks (Whitney 1981; Williams 1964), suggesting that some of the water in the basins is derived from spring discharge emanating from the deposits in a manner similar to the Rapid Creek Basin. Landslide deposits comprise a smaller percentage of the Kannah Creeks watersheds, indicating that a greater portion of water is from surface runoff. The proposed route and agency preferred route would cross the Kannah Creek watershed at the extreme lower end, well below the sources of water for the system. The pipeline routes would cross the aqueduct carrying water from the watershed to the filtration plant.

Municipal Wells

Two municipal water wells are located within 0.25 mile of the proposed route; one of these is located approximately 4 miles southeast of the town of Dolores on Lost Creek. The agency preferred route would also pass within 0.25 mile of this well. The second municipal well is located approximately 9 miles northeast of Farmington, New Mexico along the Animas River. The well is found in the valley-fill associated with the Animas River, and occurs close to the river bed. The town of Farmington obtains most of its water from Beeline Reservoir.

Other Facilities

The agency preferred route would cross the Gurley Ditch, which is a potable water supply for the town of Norwood, Colorado. Norwood obtains its water from the Gurley Reservoir, located approximately 6.5 miles upstream from the crossing point. In addition, this route would be located approximately 1,000 feet west of the Gurley Reservoir. The pipeline would cross the Dolores River, approximately 2.5 miles upstream of the potable water supply intake for the town of Dolores (Butler 1991). The current sole water source for Mesa Verde National Park consists of a 5-inch water line. The National Park Service is in the process of installing a new parallel line. This water line would be crossed by the agency preferred route at MP 225.5.

The routes would cross the Animas River in New Mexico approximately 8 miles upstream of the Farmers Ditch intake in Farmington. The Farmers Ditch is the primary source of water to Farmington Lake, which is the major potable water supply storage facility for the city of Farmington. Farmington Lake is located at the southern end of the Farmington Lake watershed. This watershed is managed by the BLM to protect the water supply from contamination.

Bureau of Reclamation Water Projects

The proposed route and some of the route variations would cross existing irrigation canals owned or administered by BuRec. The proposed route would cross the existing Mancos-Jackson Gulch Dam inlet canal at MP 237.3. (BuRec 1991).

The Mancos Valley East variation (Appendix B) would cross the Jackson Gulch Dam inlet canal at MP 17.1. The San Juan Valley variation would cross the Dolores-Towaoc Canal (part of the Dolores Project) at MP 9.5, MP 14.0, MP 15.0, and MP 15.7. The Animas Valley variation would cross canals supplying the Florida project at MP 51.7, 53.0, and 57.1 (BuRec 1959, 1986, 1987, and 1991).

The Animas-La Plata project would develop water for irrigated agriculture and municipal and industrial use in both Colorado and New Mexico. The construction of this project would include two proposed dams and reservoir systems, the Ridges Basin and the Southern Ute. In addition, system water transport structures including canals, conduits, pipelines, and a tunnel would be constructed. The proposed and agency preferred routes would cross future water supply canals for this project at proposed Southern Ute dam and reservoir at proposed route MP 273 and MP 275 in New Mexico (BuRec 1986).

BuRec is constructing the Animas-La Plata project. The BuRec has been consulted in regard to the proposed pipeline project. They have suggested mitigation measures which would protect their interests for existing and future projects. These measures have been incorporated Into Chapter 2, Environmental Protection Measures. TransColorado would obtain a ROW grant for crossing any of BuRec project canals.

WETLANDS

Wetlands are areas where the water table is at or near the soil surface for at least part of the year. Wetlands support plants that require or tolerate saturated soil conditions. In western Colorado, perennial and Intermittent streams (riverine), and the adjacent trees, shrubs, and meadows that depend on subsurface water provided by the stream system (palustrine) may be classified as wetlands, according to the National Wetland Inventory Classification System (Cowardin et al. 1979). Other areas that support wetland plants include seeps that form below springs and unlined irrigation ditches and stock ponds. Wetland (hydric) soils have not been specifically categorized for western Colorado counties; the U.S. Fish and Wildlife Service (USFWS) has not prepared National Wetland Inventory maps for this region. As a consequence, estimates of wetland extent are based on vegetation characteristics discernible from aerial flyovers and aerial photography.

Tables C-1 and C-2 in Appendix C provide a list of the various types of wetlands crossed by the proposed route and the agency preferred route, the number of crossings, milepost location, and the linear extent of wetlands crossed. Tables 2-4 and 2-14 provide a summary of wetlands crossings. The proposed route would cross 1.4 miles of wet/meadow hayland, 0.2 mile of shrub wetland and 1.5 mile of forest wetland. The agency preferred route would cross 1.4 miles, 0.1 mile and 1.5 mile, respectively.

The primary functions of wetlands in this region are sediment retention, which reduces the suspended sediment loads in streams; fish and wildlife habitat (provided by flowing streams, and riparian trees, shrubs, and wet meadows); livestock forage; and recreation (fishing, hunting). Because of the productive understory, nearly all wetlands crossed by the project are subject to intensive year-round or seasonal grazing. As a consequence, the understory vegetation on seasonally wet sites often consists of grazing-tolerant grasses, such as Kentucky bluegrass and quackgrass. On sites that are wet year-round, the native sedges, rushes, and spikerushes effectively tolerate grazing.

The wetlands most sensitive to disturbance in terms of fulfilling the wetland functions just described include riparian woodlands, beaver ponds, and spring meadows and seeps. On ungrazed sites riparian trees regenerate quickly. On grazed sites riparian trees require a long period to regenerate after they are cut, and natural reproduction is very uncertain. Beaver ponds represent Important stream sediment traps.

SOILS

Soils in the region crossed by the proposed and agency preferred routes have formed from weathered sandstone, shale, and siltstone on side slopes and ridges. These routes would cross unconsolidated water-deposited soils on valley floors. The predominant uses of soils on the lands crossed by the project are for rangeland, forestry,

and irrigated and dryland croplands. The following section on prime and unique farmlands describes the locations where existing or potential high-value lands would be crossed.

Soil stabilization and revegetation after disturbance may be difficult along several portions of the proposed and agency preferred routes because of constraints caused by steep slopes, soil chemistry limitations on plant growth, sparse precipitation, and excessive rockiness. These constraint areas have been determined from published soils information and tabulated by route in Tables 2-4 and 2-14. The following sections briefly summarize the type of constraint and the major locations where the constraints occur. Figures 3-1 and 3-4, located at the end of this chapter, illustrate these constraint areas.

Salinity/Alkalinity

Saline soils contribute natural and agricultural runoff that increases the salinity of the Colorado River. The United States adopted a policy of limiting salinity concentrations of the Colorado River in the lower basin and Mexico. As a consequence, the United States is actively trying to reduce the salinity load in the Colorado River system by eliminating salt sources, and conducting watershed erosion control programs to reduce the overland transport of saline sediment. BuRec has classified the Roan Creek Valley, Plateau Creek Valley, the Grand Valley near Grand Junction, and the Gunnison River Valley near Delta as moderately saline. BuRec has also classified portions of the Disappointment Valley and Dry Creek Basin in Dolores County as moderately saline (BLM 1977). These moderately saline soils are derived from marine shales of the Wasatch Formation and the Mancos shale. Potential contribution to Colorado River salinity from construction of the pipeline across these saline soils was raised as a project scoping issue. Figure 3-4 outlines the general areas with saline soil problems. The proposed route would cross 58 miles of saline soils; the agency preferred route would cross 42 miles.

Alkali soils containing elevated levels of exchangeable sodium also adversely affect plant establishment and growth, and soil structure. Common problems associated with alkali soils include high shrink-swell potential; very poor water-holding capacity and increases in soil erosion potential, and corresponding high runoff potential; and high clay and silt content, which exacerbates sediment losses. These soils are subject to mechanical compaction, especially during periods of high soil moisture, which decreases water infiltration capacity and increases soil erosion potential. Other problems include excessive accumulation of certain alkaline salts at the soil surface from evaporation. High levels of alkaline salts in the surface layer discourage establishment of many native species and allow the establishment of exotic noxious weeds such as halogeton.

In conjunction with preparation of this draft EIS, a field study was conducted in the Spring Creek Basin to determine levels of soil salinity in relation to trenching depth. It was found that the sampled upland soils were generally non-saline (as indicated by electrical conductivity), particularly near the surface. Salinity and alkalinity were highest in channel banks where higher levels of soil moisture and evaporation were present. This finding indicates that stabilization of channel banks during pipeline construction is the primary measure to control increases in salinity levels followed by adequate rehabilitation of the upland basin floor soils.

The portions of the project where saline/alkaline soils are most prevalent (i.e., Grand Valley, Gunnison River Valley) also experience the least annual precipitation (often less than 8 inches). Soil limitations, combined with sparse precipitation, increase the risk of revegetation failure.

Steep Slopes

Steep slopes are a second constraint along the proposed and agency preferred routes. Steep slopes are discussed in the Topography section of this chapter. Steep slopes are illustrated on Figure 3-1 and miles crossed are indicated on Tables 2-4 and 2-14. Steep slopes increase the soil erosion hazard; south-facing steep slopes are commonly very warm, and available soil moisture is limited for plant growth.

Rocky/Stony Shallow Soils

Rocky soils (those with bedrock exposures) and soils with a disproportionately high profile content

of stones that cannot be routinely removed by trenching equipment are encountered along the route. Rocky soils are prevalent along ridges in the Piceance Basin; the Roan Cliffs above Roan Creek; the side slopes of Grand Mesa; and the San Miguel, Dolores, and Mancos River crossings. Many rocky areas coincide with steep slope areas where the pipeline crosses areas of sandstone and siltstone outcrops. The proposed route would cross 120 miles of shallow/rocky soils; the agency preferred route would cross 132 miles.

Wet Soils

Wet soils occur at stream crossings, in swales formed from irrigation runoff, and below springs. These saturated soils are addressed in the Wetlands section of this chapter. Tables 2-4 and 2-14 summarize the wetland soils that would be crossed by the project, and Appendix C lists wetlands crossings.

Agricultural Soils

Maintenance of irrigated land for agricultural productivity after pipeline construction was a major public scoping issue. Soil characteristics of concern are subsurface rocks that may require excavation and removal, topsoil depth, and soil subsidence in the trench.

PRIME FARMLAND AND FARMLANDS OF STATEWIDE IMPORTANCE

Prime farmland is land that requires irrigation, and has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Farmlands of statewide importance are lands that are not prime farmlands but are considered productive lands if erosion control methods, irrigation, and/or moderate management practices are implemented (SCS 1980a, 1982a). Tables 2-4 and 2-14 list the mileages of prime farmland and farmland of statewide importance that occur along the proposed route and the agency preferred route (SCS 1979a, 1979b, 1979c, 1979d, 1980b, and 1982b). These important farmland areas predominantly occur in four areas along the Routes: the Grand Valley, San Miguel Canyon, Dolores River Basin, and La Plata and Animas River Valley areas. The majority of these farmlands are used to grow alfalfa and small grains, although some specialty crops, such as corn (Delta area), peaches, and apples (Grand Valley area), are also grown.

VEGETATION

Environmental factors, such as elevation, soil type, and precipitation, largely influence the location of each vegetation type. The general distribution of major vegetation types found within the project area is shown in Figure 3-5, located at the end of this chapter.

A total of 12 vegetation types would be traversed by the proposed and agency preferred routes. They include: (1) sagebrush, (2) saltbush, (3) pinyon-juniper, (4) pinyon-juniper (chained), (5) mountain shrub, (6) conifer-pine, (7) conifer-spruce/fir, (8) conifer-aspen, (9) conifer-Douglas fir, (10) grassland, (11) greasewood, and (12) agricultural land. Tables 2-4 and 2-14 list the agricultural lands and timber lands and the associated mileages that would be crossed by these routes.

The following information provides habitat descriptions and dominant plant species that are commonly associated with each vegetation type. This information was incorporated from Harrington (1954), USDA-REA (1983), Brown (1982), and BLM (1978).

- Sagebrush Community. The sagebrush community is usually found adjacent to the pinyon-juniper communities in similar elevation and precipitation zones. Big sagebrush and black sagebrush are the dominant species with rabbitbrush occurring with less frequency. Other species include blue grama, galleta grass, bottlebrush squirreltail, bluegrass, Indian ricegrass, cheatgrass, globemallow, prickly pear, western wheatgrass, and Thurber's fescue.

- Saltbush Community. The saltbush community in western Colorado and New Mexico includes several species of saltbush and is typically located between the pinyon-

juniper vegetative community and irrigated croplands found along river valleys. Saltbush exists in areas where annual precipitation averages less than 10 inches. The dominant species include shadscale, mat saltbush, Gardner saltbush, and four-wing saltbush. Prevalent grasses are galleta, blue grama, and bottlebrush squirreltail.

- Pinyon-Juniper Community. The pinyon-juniper vegetative community is located in the foothills and mesa areas of southwest Colorado and northern New Mexico. The pinyon-juniper community is usually found where annual precipitation ranges from 10 to 16 inches and at elevations from 6,200 to 7,400 feet. In Colorado, the major overstory plants of this community are Colorado pinyon pine and Utah juniper. In New Mexico, the major overstory plants are Colorado pinyon pine and one-seed juniper. Such grasses as bottlebrush squirreltail, Indian ricegrass, and needle-and-thread grass generally dominate the understory in Colorado. In New Mexico, the dominant understory is blue grama and galleta grass. Open sagebrush areas consisting of big sagebrush, black sagebrush, and rabbitbrush are often interspersed with the pinyon-juniper community.

- Pinyon-Juniper (Chained) Community. The pinyon-juniper (chained) vegetative community is located predominantly in the southwestern part of Colorado. This vegetation type is a pinyon-juniper community that has been mechanically chained for the purpose of rangeland improvement. This vegetation type supports the same plant species as the pinyon-juniper type but has a lower density of pinyon pine and junipers and a higher density of grasses and forbs.

- Mountain Shrub Community. The mountain shrub community includes untimbered lands where shrubs other than sagebrush and rabbitbrush predominate. It generally occurs in areas with 14 to 18 inches of annual precipitation, at elevations from about 6,000 to 9,000 feet. The major overstory species are Gambel oak, common serviceberry, and mountain mahogany. The understory consists of bluegrass, smooth brome, and arrowleaf balsamroot.

- Conifer-Pine Community. The conifer-pine vegetative community ranges in elevation from 5,500 to 9,000 feet. Dominant plant species include ponderosa pine, aspen, and pinyon pine. Common understory species include fescue, bluegrass, junegrass, and western yarrow.

- Conifer-Spruce/Fir and Conifer-Douglas Fir Communities. The spruce/fir-Douglas fir forests are found within a range of elevations from 7,000 to 11,500 feet. The pure Douglas fir forest occurs at elevations from 6,000 to 8,500 feet. Aspen occurs throughout these coniferous forests at all elevations.

- Conifer-Aspen Community. The conifer-aspen community is found at the higher range elevations from 6,000 to 11,000 feet, which receive 20 inches or more of precipitation annually. Douglas fir, subalpine fir, blue spruce, Engelmann spruce, ponderosa pine, and aspen are the major overstory species. Understory species include fescue, junegrass, western yarrow, bluegrass, and alpine timothy.

- Grassland Community. This vegetation type is dominated by grasses and covers the majority of the route. Numerous shrub and forb species are also present. The common shrub species that occur in this vegetation type include various sagebrush species, four-wing saltbush, winterfat, snakeweed species, and soapweed. The herbaceous species that are associated with this vegetation type include bahia species, aster species, thistle species, gaura species, and sunflower species. Numerous cacti are commonly associated with this vegetation type. Common grass species include various grama species, Arizona fescue, galleta, Indian ricegrass, and alkali sacaton.

- Greasewood Community. The greasewood community occurs in a narrow band along water courses within a wide range of elevations from 3,600 to 6,500 feet. Major plants representing this community are black greasewood, alkali sacaton, broom snakeweed, and wild daisy. Other plants common to this community include sagebrush, saltgrass, saltbush, foxtail barley, cocklebur, ragweed, and Russian thistle.

- Agricultural Lands. Agricultural lands include land used for dryland and irrigated crops and pasture.

- Barren Areas. Barren areas are nearly devoid of vegetation due to mining, erosion, or poor soil conditions. Plant species such as saltbush, alkali sacaton, ring muhly, and ricegrass commonly occur in disturbed areas and in areas with poor soil conditions.

- Meadow Community. The meadow community occurs most commonly in alpine areas over a wide range of elevations (7,500 feet to 12,000 feet). Major plants representing this community include prairie junegrass, carices, and Idaho fescue.

Table 3-3 lists the noxious weeds that are known to occur in the project areas; these weeds include diffuse knapweed, spotted knapweed, Russian knapweed, musk thistle, Canada thistle, field bindweed, leafy spurge, tall whitetop, whitetop halogeton, hounds tongue, Russian thistle, and kochia (Beck 1991; Peterson 1991; Leininger 1988). Diffuse knapweed, spotted knapweed, Russian knapweed, Canada thistle, and Russian thistle are the major weed species in the project area and warrant the most attention.

Appendix D, provides recommended revegetation seed mixes that would be best suited for existing conditions.

FORESTRY

National Forests in the vicinity of the proposed and agency preferred routes are the Uncompahgre, Grand Mesa and Gunnison National Forests and San Juan National Forest. The Uncompahgre National Forest is partially located in Montrose and San Miguel Counties. Portions of the San Juan National Forest are located in Dolores, Montezuma, and La Plata Counties. In addition to the National Forests, wood resources are located in all 10 potentially impacted counties, on both state and private lands, and on lands under the jurisdiction of the BLM.

The forests in western Colorado and northwestern New Mexico can be generally described as pinyon-juniper in lower elevations with ponderosa pine, Douglas-fir, quaking aspen, Engelmann spruce, lodgepole pine, and subalpine fir at higher elevations (USFS 1987). According to the forest land and resource management plan for the Grand Mesa, Uncompahgre, and Gunnison National Forests and the plan for the San Juan National Forest, the forests are not in optimum growing condition, citing that many stands are "...overmature and therefore susceptible to losses from insect and disease infestations" (USFS 1983 and 1987).

Tables 2-4 and 2-14 indicate miles of timber lands and pinyon-juniper woodlands crossed by the proposed and agency preferred routes. Figure 3-5 indicates locations of forests and woodlands. The proposed route crosses approximately 29 miles of timber resources and 70.1 miles of pinyon-juniper woodlands and the agency preferred route crosses 17 miles of timber lands and 72.4 miles of woodlands. Table 3-4 provides saw timber volume per acre, price per thousand board feet (MBF) (1990 dollars), and rotation age by timber type and forest. Table 3-4 also provides estimated per acre volumes and values for fuel wood.

LIVESTOCK GRAZING

The most common livestock operations in the area are cow/calf operations. , Ewe/lamb operations also occur in the region. In general, cattle are grazed on Federal lands (grazing allotments) in the spring, summer, and fall. In the winter, cattle are generally fed or supplemented with hay or put out to graze on lower elevation pastures.

Federal lands in the region (BLM, USFS) are divided into grazing allotments where individual ranchers (permittees) can graze livestock according to agency guidelines. On BLM land crossed by the pipeline routes, grazing allotments range in size from around 1,500 to over 30,000 acres. The majority of livestock use on BLM lands occurs in the spring and fall. Higher elevation BLM ranges also may receive summer grazing. Some winter grazing occurs on lower elevation ranges, especially by sheep (Giffen 1991; Stovall 1991; Thygerson 1991). On USFS lands that would be crossed by the proposed and agency preferred routes, grazing allotments range

TABLE 3-3

TransColorado Gas Transmission Project Area
Noxious Weeds

Species	Distribution	Favored Sites
Diffuse Knapweed	S.W. Colorado (Montrose, San Miguel, Dolores, and Montezuma Counties) and NW New Mexico (San Juan Co.)	Soil disturbed sites and also rangeland areas
Spotted Knapweed	S.W. Colorado (Montrose, San Miguel, Dolores, and Montezuma Counties) and NW New Mexico (San Juan Co.)	Soil disturbed sites and also rangeland areas
Russian Knapweed	Throughout western Colorado and NW New Mexico (San Juan Co.)	Cultivated, grain and alfalfa fields, pastures, roadsides, irrigated ditches, and waste sites
Musk Thistle	S.W. corner of Colorado and NW New Mexico (San Juan Co.)	Moist alluvial soils
Canada Thistle	Throughout the state of Colorado and NW New Mexico (San Juan Co.)	Fertile, well drained soils in wasteland areas, pastures, grain fields, and rangeland areas with swales and areas with deep, moist soils
Bindweed	Throughout state of Colorado	Cultivated fields, waste sites
Leafy Spurge	N.W. Colorado (Rio Blanco, Garfield, Mesa, Montezuma, and Dolores Counties) and NW New Mexico (San Juan Co.)	Moist areas, dry upland sites, shallow rocky soils, and drainageways
Tall Whitetop	N.W. Colorado	Wastelands, wet areas, ditches, and roadsides
Whitetop	N.W. Colorado	Wastelands, wet areas, ditches, and roadsides
Halogeton	Western Colorado and NW New Mexico (San Juan Co.)	Alkaline and disturbed areas
Russian Thistle	Throughout the state of Colorado and NW New Mexico (San Juan Co.)	Wastelands, disturbed sites, and fields
Kochia	Throughout the state of Colorado and New Mexico (San Juan Co.)	Wastelands, disturbed sites, and fields
Hounds Tongue	Primarily throughout the mountainous regions of Colorado	Disturbed sites in cultivated and forested areas that range in elevation 5,000 to 9,000 feet

TABLE 3-4

TransColorado Gas Transmission Project
Forest Timber Characteristics

	Aspen	Ponderosa Pine	Spruce/Fir	Fuel Wood
Uncompahgre National Forest				
Includes Grand Mesa, Uncompahgre, and Gunnison National Forests				
Saw Timber Volume/acre (MBF)[1]	9	3	15	
Price/MBF (1990 $)[1]	13.75	20.35	41.75	
Rotation Age (years)[2]	80-100	50-180	50-180	
San Juan National Forest				
Saw Timber Volume/acre (MBF)[3]	10	5	19	
Price/MBF (5-year Average 1990 $)[3]	21.26	70.03	52.29	
Rotation Age (years)[4]	75-120	50-180	50-180	
White River Resource Area				
Fuel wood volume/acre (cords)				N/A
(price per cord $)				7.50
Uncompahgre Resource Area				
Fuel wood volume/acre (cords)				N/A
(price per cord $)				5.00
San Juan Resource Area[5]				
Fuel wood volume/acre (cords)				6-15
(price per cord $)				5.00
Grand Junction Resource Area[6]				
Fuel wood volume/acre (cords)				5-17
(price per cord $)				5.00
Farmington Resource Area				
Fuel wood volume/acre (cords)				6-12
(price per cord $)				7.00

[1]Jarrell 1991.

[2]USFS 1987, as amended.

[3]Jones 1991.

[4]USFS 1983.

[5]Christenson 1991.

[6]Stevens 1991.

in size from approximately 3,000 acres to approximately 20,000 acres. The majority of livestock use on USFS allotments occurs during the summer and fall (Baldwin 1991; Dickerson 1991).

The number of animals that can be grazed in an allotment is a function of forage production and the amount of forage that can be removed without decreasing range condition. Forage is allocated to livestock by animal unit months (AUMs). An AUM is the amount of forage required to sustain a cow/calf unit for 1 month. General AUMs by vegetation type are as follows (Baldwin 1991; Dickerson 1991; Giffen 1991; Jurgens 1991; Stovall 1991; Thygerson 1991):

Vegetation Type	Average AUM/Acre	Average Acre/AUM
Sagebrush	0.1	10.0
Saltbush	0.08	12.5
Desert Grassland	0.1	10.0
Mountain Shrub	0.13	7.7
Pinyon-Juniper	0.07	14.3
Conifer Forest	0.13	7.7

WILDLIFE

Major vegetation types that would be crossed by the proposed and agency preferred routes have been previously discussed. Figure 3-5, located at the end of this chapter, shows how these vegetation types occur in relation to the pipeline routes. These vegetation communities support a wide diversity of wildlife species. Mountain shrub, pinyon-juniper, and sagebrush are important communities for wintering big game species. Riparian and wetland communities support the greatest diversity of wildlife species in the region. This discussion will focus on species of high economic and/or recreational importance. Figure 3-6, located at the end of this chapter, shows the locations of key wildlife ranges and state wildlife areas that would be crossed by the routes. Tables 2-4 and 2-14 summarize the miles of key wildlife ranges that would be crossed by the proposed and agency preferred routes, and Tables 2-10 and 2-16 indicate recreationally and economically important wildlife species by milepost.

Big Game

Big game animals occurring in the project area include elk, mule deer, antelope, bighorn sheep, black bear, and mountain lion. Elk, mule deer, and antelope key ranges (i.e., winter concentration areas, severe winter range, crucial range calving areas, fawning areas) crossed by the proposed route and agency preferred routes are identified on Figure 3-6 (CDOW 1990B; BLM 1984a, 1984b, 1985, 1987a, 1987b, 1988; BLM 1990 files; New Mexico Game and Fish 1991). Tables 2-4 and 2-14 summarize the miles of key big game ranges crossed by each pipeline route.

Elk occur mainly in high- to mid-elevation conifer, meadow, mountain shrub, and pinyon-juniper habitats. Mountain shrub, pinyon-juniper, and lower conifer are the most common habitats utilized by elk as winter ranges. Mule deer occur in all habitats that would be crossed by the proposed and agency preferred routes. Mountain shrub, pinyon-juniper, and sagebrush are utilized as winter ranges. Antelope occur in saltbush habitats along the Gunnison River between Grand Junction and Delta and in saltbush and sagebrush habitat in the Disappointment Valley and Dry Creek Basin. No pipeline routes would cross bighorn sheep range; however, bighorn range does occur in nearby areas.

Black bears are most common in conifer, mountain shrub, and pinyon-juniper habitats. No key black bear ranges have been identified in the areas that would be crossed by the pipeline routes. Mountain lions are dispersed mainly through conifer, mountain shrub, and pinyon-juniper habitats. Higher mountain lion population densities are often associated with big game concentration areas. No key mountain lion ranges have been identified in the areas that would be crossed by the proposed and agency preferred routes. However, the Menefee Mountain, Mancos Hill area has one of the highest mountain lion densities in Colorado (Skiba 1991).

Small Game

The cottontail rabbit, red squirrel and Abert's squirrel are common small game mammals in the area. Furbearers include the beaver, muskrat, mink, pine marten, bobcat, and coyote.

Upland game birds in the area include the turkey, blue grouse, sage grouse, ring-necked pheasant, mourning dove, and band-tailed pigeon. Sage grouse leks and nesting areas that would be crossed by the proposed route and agency preferred route are identified in Figure 3-6 and tabulated in Tables 2-4 and 2-14 (CDOW 1990b; BLM files 1990).

Numerous species of waterfowl nest, winter, and migrate through the region. Common nesting species include the Canada goose and mallard. Canada goose nesting platforms occur along the pipeline routes at the Colorado and Gunnison River crossings (Clark 1990). Riparian areas, wetlands, ponds, and reservoirs are the most important habitats for nesting, migrating, and wintering waterfowl.

Non-Game

Many non-game species (non-game birds, reptiles, and amphibians) occur in the different habitats that would be crossed by the pipeline routes. High-interest species include the great blue heron and other waterbirds and raptors. The proposed and agency preferred routes would pass near great blue heron rookeries at the Colorado and Gunnison River crossings (Clark 1990; Rose 1990) (Figure 3-7, located at the end of this chapter). The southwestern willow flycatcher (a Federal C2 species) is also known to occur in willow stands along the Gunnison River. Riparian areas and wetlands are the most important habitats for waterbirds.

The golden eagle is the only non-endangered raptor species currently recorded as nesting within 1 mile of the proposed route and agency preferred route. The general locations of raptor nesting areas are provided in Figure 3-7, located at the end of this chapter. Many additional raptor species nest, migrate, and winter in the region.

Common amphibians occurring in the project area include the tiger salamander and northern leopard frog (Hammerson 1982). Amphibians are dependent on riparian and other wetland areas. Common reptiles occurring in the project area include the short-horned lizard, the eastern fence lizard, the bullsnake, the western terrestrial garter snake, and the western rattlesnake.

FISHERIES

The proposed route and agency preferred route would cross perennial streams in Colorado and New Mexico (See Appendix C, Tables C-1 and C-2). No lakes would be crossed by either route. Flowing waters in western Colorado and New Mexico consist of cold water mountain streams and warm water streams and rivers at lower elevations. Most of the streams that would be crossed are relatively small with widths less than 50 feet. Crossings would occur at the following moderate and large-sized rivers: Colorado, Gunnison, San Miguel, Dolores, La Plata, Animas, and Mancos. Descriptions of the various drainages and streams within the study area are provided in Appendix C.

Fish communities in the streams are comprised of trout, minnows, suckers, catfishes, sunfishes, sculpins, and killifishes. The number of fish species known to occur in the streams ranges from 2 to 21 (CDOW 1990a). In general, most of the mountain streams support 2 to 8 species. The most diverse fish communities are found in the larger rivers such as the Gunnison and Colorado, with 14 and 21 species, respectively. Important recreational fish species occurring in the Class 1 and Class 2 cold water streams include rainbow trout, cutthroat trout, brown trout, and brook trout. Trout fisheries are known to occur in the Colorado River, Gunnison River, San Miguel River, Dolores River, Animas River, and the La Plata River. The only recreationally important warm water species are catfishes and sunfishes, which are known to occur in the Colorado River, Gunnison River, and Roubideau Creek. Small perennial streams (not ranked as Class I or Class 2 cold water fisheries) also have native non-game fisheries.

In accordance with the New Mexico Water Quality Classification Standards, streams would be considered important if they contain recreational or native species, or threatened or endangered species. The majority of the streams that would be crossed in New Mexico are intermittent and do not contain important fish species on a permanent basis. The Animas River and upper La Plata Rivers support a permanent trout fishery.

Benthic macroinvertebrates represent another important aquatic community in streams that

would be crossed by the proposed and agency preferred routes. The type of benthic macroinvertebrates occurring in the streams depends mainly on the type of substrate, stream velocities, depths, temperature, and other chemical characteristics. In general, the small mountain streams are dominated by mayfly, stonefly, blackfly, midge, and caddisfly larvae that prefer gravel to boulder substrates. Macroinvertebrate communities in small to large-size streams at lower elevations usually are comprised of more silt- and temperature-tolerant groups such as midge, caddisfly, dragonfly, damselfly larvae, as well as beetles and worms. The midge and caddisfly species are usually different from those found in mountain streams. Production in the streams is quite variable, depending on the habitat conditions, but the highest numbers usually are found in the larger, warm water streams.

THREATENED AND ENDANGERED SPECIES

Based upon the list provided by the U.S. Fish and Wildlife Service (1990), the proposed pipeline crosses potential habitat for four Federally-listed terrestrial species, three Federally-listed fish, eight Federally-listed plants, two species proposed for listing, and 20 species which are Category 1 or 2 candidates for listing. These species, as well as state-listed and sensitive species, and Forest Service sensitive species, potentially present in the pipeline corridor are presented in Appendix Table E-1 and Figure 3-7 (BLM 1990 files; Colorado Natural Areas Program 1990; Navajo Natural Heritage Program 1990; New Mexico Natural Heritage Program 1991).

BLM policy requires protection of state-listed species equal to that provided for Federally-listed species. Colorado does not have legally-protected plants as does New Mexico, but both states maintain lists of animals protected under state law as threatened or endangered. All but six state-listed species (five animals, and one plant) are either Federally-listed, proposed for Federal listing, or are candidates for Federal listing. Of these six, only the river otter, listed as endangered in Colorado, is currently known to exist in habitats crossed by the proposal.

Animals

Available information, and inventories completed in support of this proposal, indicate that only the bald eagle, Mexican spotted owl, black-footed ferret, river otter, Colorado River squawfish, humpback chub, and razorback sucker are known to occur or have a high probability to occur along the project routes.

Bald eagles occur primarily as wintering species with concentrations along major rivers and some crucial big game winter ranges. One communal roost in a winter concentration area is located adjacent to the proposed and agency preferred routes. One bald eagle nest is known to exist in the Cortez and Durango areas.

Although black-footed ferrets have not been found in Colorado or New Mexico in recent years, prairie dog colonies, providing suitable habitat, have been found along the proposed routes. Field clearances will be conducted during the summer of 1991.

Mexican spotted owls are a resident species in New Mexico and southern Colorado. Suitable habitats along the proposed and agency preferred routes have been mapped in preparation for intensive inventories during the summer of 1991 and 1992.

River otters (endangered in Colorado) are known to exist in the Gunnison River. The proposed Gunnison River crossing is not in an area where otter use has been documented, and is not considered important otter habitat.

The Colorado River squawfish, humpback chub, and razorback sucker are known to occur in the Colorado River. The squawfish and humpback chub are also known to occur in the Gunnison River.

Of the candidate animal species, only the southwestern willow flycatcher occurs along the proposed line, at the Gunnison River crossing.

Plants

Ongoing plant surveys, being conducted by the U.S. Fish and Wildlife Service, have located the beautiful gilia, Uinta Basin hookless cactus, and Wetherill milkvetch on or adjacent to the agency

preferred route. Minor rerouting to avoid the gilia has already occurred. Uinta Basin hookless cactus and Wetherill milkvetch occurrences can be avoided with minor shifts in pipeline location or restrictions in disturbance width (USFWS 1991).

There is a high probability that the Debeque phacelia will be present along the proposed route line north of Debeque. It is unclear at this time if avoidance of these plants would be possible (USFWS 1991).

CULTURAL RESOURCES

A cultural resource overview (Chandler et al. 1991) was conducted for archaeological and historical resources present within the 75-foot-wide ROW traversed by the proposed and agency preferred routes, as well as within a 0.5-mile-wide study area on each side of the route center lines. It must be noted that Class I research results are a direct reflection of the size, distribution, and level of intensity of previous cultural resource investigations. Forty-eight percent of the proposed route has been inventoried for cultural resources. The agency preferred route is 12 miles shorter, and 49 percent of that route has been surveyed. Table 3-5 provides a summary of the recorded sites along both routes.

Lack of known cultural resources in any particular area of the project does not necessarily signify that sites do not exist, nor can it be stated with certainty that site probability is low when comprehensive inventories have not been conducted. Thus, the following statements regarding cultural resources must be considered preliminary, pending the results of Class III inventories. Results of the Class III inventory will be included in the final EIS.

Until proven otherwise, all archaeological sites are presumed to be significant, and avoidance of sites is the preferred policy. The programmatic agreement (Appendix F) delineates treatment of archaeological sites, with further discussion of mitigation measures and statutes mandating such measures are also provided in Appendix F.

Tables 2-4 and 2-14 provide an estimate of the projected number of sites and relative cultural resource sensitivity of the routes. Table 3-5 provides an accounting of cultural resources along the proposed and agency preferred routes. A brief description of the variables found in Table 3-5 is provided in Appendix F.

Western Colorado and northwestern New Mexico have been occupied sporadically for nearly 12,000 years. Native American occupation includes Paleoindian (10,000-5500 B.C.), Archaic (5500 B.C.-A.D. 0), Formative (Anasazi and Fremont A.D. 0-1300), and the Protohistoric (Ute and Navajo) and Historic periods (A.D. 1300-ca. 1850). The Ute and Navajo occupy the area today.

Historically, the Spanish were the first to penetrate the region in the 1700s, followed by fur trappers, government expeditions, and gold seekers in the 1800s. Ten years after the initial gold strike along the Front Range, southwestern Colorado experienced the same influx of treasure seekers in the area of the newly established Southern Ute Reservation. Passage in 1874 of the Brunot Treaty opened millions of acres for settlement and mineral development (O'Rourke 1980). Subsequent conflict with the Utes culminated in the Meeker Massacre in 1879, and by 1881 the Utes were reservation-bound in southwestern Colorado and eastern Utah (Chandler et al. 1991). Detailed information regarding the cultural overview can be found in Husband (1984) and O'Rourke (1980).

Archaeological sites representing the protracted prehistoric sequence are characterized by short- and long-term camps; lithic and ceramic scatters; architectural sites, including habitations, storage facilities, and water control systems; rock art; quarries; and stone circles. Protohistoric and historic sites are manifested in Indian camps, sweat lodges, habitations, rock art, and lithic and ceramic scatters; and by Euroamerican transportation and communication corridors (roads, trails, railroads), water control systems, homesteads, trash scatters, churches, cemeteries, mines, and mills. Site significance and complexity of the archaeological record are compounded by the factors of burial of sites by erosional forces and by uniqueness or paucity of certain site types.

Sites eligible for the National Register of Historic Places (NRHP) may: (1) be listed on the NRHP or (2) be determined eligible to the NRHP by the State Historic Preservation Officer and the lead

TABLE 3-5

TransColorado Gas Transmission Project
Cultural Resources

Variables		Applicant Proposed	Agency Preferred
V1 =	recorded sites within 1-mile-wide corridor	552	558
V2 =	unrecorded sites within 1-mile-wide corridor	350	374
V3 =	potentially eligible recorded sites within 1-mile-wide corridor (those sites that are unassessed, need data, or are field eligible)	72	80
V4 =	eligible recorded sites within 1-mile-wide corridor (those sites that are officially eligible for or are listed on the NRHP)	66	63
V5 =	recorded sites within 75-foot construction ROW	93	104
V6 =	unrecorded sites within 75-foot construction ROW	141	130
V7 =	potentially eligible recorded sites within 75-foot construction ROW	45	44
V8 =	eligible recorded sites within 75-foot construction ROW	16	17
V9 =	projected sites within 75-foot construction ROW	199	169
V10 =	miles of high sensitivity areas	201	174
V11 =	miles of medium sensitivity areas	58	68
V12 =	presence/absence of areas of concern to Native Americans within 1-mile-wide corridor	+	+
V13 =	presence/absence of areas of concern to Native Americans within 75-foot construction ROW	ND[2]	ND

Note: See Appendix F for more detailed information

archaeologist. Sites that are potentially eligible to the NRHP may: (1) appear eligible to the field recorder, (2) need further data to determine their significance, or (3) be unevaluated for eligibility.

The Navajo and Hopi Indian tribes contributed information on traditional cultural properties. Since these properties are regional in scale, a presence/absence indicator is provided for these features in Table 3-5. There are no known areas within project boundaries of nationwide (i.e., Navajo Nation) significance, although areas of local importance may be present (Chandler 1991).

Estimates of relative cultural resource sensitivity (high and medium) have been tabulated by miles for the proposed and agency preferred routes (Tables 2-4, 2-14, and 3-5). The sensitivity evaluation is based on the density of recorded sites within a study area, and the physical attributes of the region for supporting prehistoric and historic communities. These attributes include availability of reliable water supplies, travel routes, arable land, and natural sources of vegetable and animal foods.

Regarding both the proposed and agency preferred routes, no sites identified within the 75-foot ROW are presently listed on the NRHP, although three National Register sites are present within the 1-mile-wide study corridor. Sixty-one potentially eligible and eligible sites are associated within the 75-foot ROW of the proposed and agency preferred routes, respectively. The proposed route contains approximately 201 miles of high sensitivity areas, and 58 miles of the route are considered to be of medium sensitivity. Miles of high and medium sensitivity areas for the agency preferred route are 174 and 68, respectively (Tables 2-4, 2-14, and 3-5).

Native American Religious Concerns

Sensitivity to Native American traditional use areas and sacred sites are projected in Table 3-5. Specific information on Native American traditional use and/or sacred sites on or near the proposed route has not been received. Native American groups commonly do not wish to disclose the locations of these sites to the public. The BLM and archaeologists will continue to coordinate efforts with the affected tribes to identify these sites to assure their protection. Any site-specific information provided by tribal members will remain confidential. There are no known areas within project boundaries of nationwide (i.e., Navajo Nation) significance, although areas of local importance may be present (Chandler 1991).

VISUAL RESOURCES

A large percentage of the lands crossed by the proposed and agency preferred routes are managed by either the BLM or Forest Service. Both agencies have established visual inventory, classification, and management programs. In each system, the inventory results identify visual resource management objectives that prescribe acceptable levels of visual modification appropriate to the landscape and viewer sensitivities. Under the BLM system, these are identified as visual resource management (VRM) classes; while under the Forest Service system, they are identified as visual quality objectives (VQO).

To have a common basis to evaluate and compare all routes for the TransColorado Pipeline project, it was necessary to establish comparable classifications for all lands potentially affected by the proposed project, including private and Indian lands. This was accomplished using the same inventory considerations used by the BLM and Forest Service systems. The methodology for this classification system is described in Appendix G. It should be noted that although BLM and Forest Service classifications were assigned to private and Indian lands as a comparative baseline indication of visual values, it is recognized that these classifications have no management implications here as they do on their respective agency lands.

Landscape conditions throughout the study area are highly diverse and generally very scenic because of the area's location at the interface of two major and distinctive landscape provinces: the southern Rocky Mountain and Colorado plateaus provinces. Topographic features in the area include badlands; agricultural valleys; high, rolling plateaus; dramatic, rocky escarpments; pinyon-juniper foothills; dense, forested mountains; and scenic river canyons.

While remote by most standards, this area contains a number of major highways and

secondary roads and trails, as well as numerous communities and scattered rural residences. Three highways in the study area have been designated as State Scenic Byways. Colorado State highways 145 and 160 in the study area have been designated as a Federal and state scenic byway, called the San Juan Skyway. Another scenic byway crossed is the Unaweep/Tabeguache Scenic and Historic Byway. In areas where highly scenic landscapes are visible, where there is adequate public access, or where public sensitivity for landscape values is known to be high, higher visual management standards have been designated.

Areas designated as being of highest visual value, or highly sensitive from a visibility standpoint, include the following. At the very northern end of the project area, a 3-mile segment along Piceance Creek has been designated as being of high value. Similarly, the 2,000-foot escarpment along the Roan Cliffs (north of Debeque) are both scenic and sensitive. A unique rock formation exists near Black Mountain. The western face of the Grand Mesa forms a scenic focal point for the Grand Valley and is, therefore, highly sensitive. Further to the south, Roubideau Creek has been designated as high landscape value by the BLM. An additional drainage/river crossing designated as highly sensitive is the dramatic and scenic San Miguel River Canyon. Nearby, the west slope of the Uncompahgre Plateau forms a regional focal point as seen from the Norwood-Redvale area.

A large portion of the Forest Service lands between the Belmear Mountain-Beaver Mountain area and the Dolores River Canyon has been designated as being of high value. The Dolores River Canyon itself is highly scenic and has also been designated as high value. The National Forest and private lands along Highway 145 (Dolores River) and Highway 160 (Cortez to Durango) have been recognized as having high scenic quality and sensitivity and, as mentioned above, are components of the San Juan Skyway. Finally, approximately 12 miles of land paralleling U.S. Highways 550 west of Farmington have been designated as high value by the BLM.

Figure 3-8, located at the end of this chapter, shows more detailed information regarding the VRM/VQO designations for lands along the proposed and agency preferred routes. Distances for high and moderate visual contact along each route are summarized in Tables 2-4 and 2-14. In addition, Appendix G, Table G-1 highlights more specific information regarding conditions of those areas designated as Retention/Class II and Partial Retention/Class III, as well as major sensitive viewpoints.

NOISE

The existing noise environment is characterized by ambient noise levels, existing noise sources, the existence of noise-sensitive receptors in the vicinity, and local terrain features that may affect noise transmission.

TransColorado's pipeline routes and compressor station sites would be located primarily in agricultural areas (rangeland and/or cropland) or forest. Because of the rural, agricultural, and low-density residential land uses, existing ambient noise levels in the project area are generally quite low. It is estimated that day-night average levels (L_{dn}) are in the 35 to 40 dBA range for most of the project area. Typical noise levels in the more developed/suburban areas are estimated to be in the 40 to 50 dBA range.

Since measured noise data for the proposed and agency preferred routes and compressor station sites do not exist, the range presented has been estimated from empirical techniques and measured data for similar geographic and demographic areas. The relationships between population density and noise levels are presented in Table 3-6. Population densities for the project area range from a low of 1.5 persons-per-square-mile in Dolores County, Colorado to a high of 26.9 persons-per-square-mile in Mesa County, Colorado.

Noise sources in rural areas are predominantly natural, including insects, birds, wind, and weather. Roadway traffic and farm machinery contribute to overall levels in limited areas, and in the case of farm machinery, on a seasonal basis. Heavier traffic levels, commercial activities, and more intense concentrations of human activity, in general, result in relatively higher ambient levels.

Noise-sensitive receptors near the proposed and agency preferred routes are limited to residential clusters, recreational resources, and scattered residences. A residential housing inventory of the

TABLE 3-6

TransColorado Gas Transmission Project
Typical Values of Yearly Day-Night Average Sound Levels

Description	Population Density (people/sq. mi.)	L_{dn} - dBA
Rural (undeveloped)	20	35
Rural (partially developed)	60	40
Quiet suburban	200	45
Normal suburban	600	50
Urban	2,000	55
Noisy urban	6,000	60
Very noisy urban	20,000	65

Source: NAS 1977.

project area was completed in January 1991. Residential houses within 500 feet of the center line of the proposed and agency preferred routes and occupied structures within 1 mile of the proposed or alternate compressor station sites (nearby noise-sensitive areas) were identified and mapped. The results of this inventory are summarized in the Socioeconomic Conditions section in this chapter. Noise-sensitive receptors near compressor station sites are listed in Table 3-7.

Topography in the project area varies from flat, agricultural land, particularly along the river valleys, to wooded, gently rolling terrain, to steep canyon topography. Consequently, any effect from terrain on noise propagation would vary from area to area.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

The proposed route would travel near the Dudley Bluffs Area of Critical Environmental Concern Research Natural Area (ACEC-RNA); the route does not intersect with this area (see Figure 3-9, located at the end of Chapter 3). The ACEC is located along Piceance Creek within the Piceance Basin in the White River RA. The Dudley Bluffs ACEC has been designated by the BLM due to sensitive plant species and remnant vegetation communities located in the bluff area (Roberts 1991).

TRANSPORTATION

The western region of Colorado and northwestern New Mexico's San Juan County are generally rural in character, with the exception of five small to mid-sized urban areas. Roadway systems in the area link small communities and facilitate travel to the larger communities and retail and recreation centers of Grand Junction, Montrose, Durango, Cortez, and Farmington.

U.S. Interstate 70 (I-70) and U.S. Highway 50 are the two primary east-west arterials linking this region to central Utah and the western states, as well as to Denver, southern Colorado, and the eastern United States. The majority of I-70 is a four- to six-lane interstate. U.S. Highway 50 is a two-lane roadway from Grand Junction to Delta and a four-lane highway from Delta to Montrose. Western Colorado and northwestern New Mexico are further accessed by the north-south traveling U.S. Highways 550 and 666. U.S. 550 connects Montrose and Farmington via the heavily traveled "Million Dollar Highway." U.S. 666 connects Cortez with Gallup, New Mexico via the town of Shiprock. Colorado State Highways 145 and 160, as well as several other highways and a network of county and private roads, complete the transportation infrastructure of this region.

The railroad network in this region consists of national rail hubs at Salt Lake City, Utah and Denver, Colorado. These hubs are linked by the Rio Grande Southern Pacific Railroad network. This railroad enters Colorado on its western border at Grand Junction and continues along the I-70 corridor to the Denver hub. A railroad spur travels from Grand Junction to Delta with a branch line terminating at Montrose. Officials at the Rio Grande Southern Pacific Railroad have indicated that the lines proposed for use by TransColorado are operating at 50 percent capacity and could readily accommodate the needs of the TransColorado project (Smith 1991). The Sante Fe Railway serves the southwestern United States, with a hub in Albuquerque and access to Gallup, New Mexico.

Air travel in this region is provided by commercial carrier to Grand Junction, Montrose, Cortez, Durango, and Farmington. Several smaller air strips in the region can also accommodate private or chartered carriers.

Table 3-8 indicates all state and Federal highways proposed to be utilized as haul roads during construction.

SOLID AND HAZARDOUS WASTES

The proposed route and agency preferred route do not cross any hazardous waste sites (EPA 1990a, 1990b). However, the routes travel approximately 0.10 mile from the Cheney disposal site in the vicinity of MP 90.0. The disposal site is a repository for radioactive tailings from a

TABLE 3-7

TransColorado Gas Transmission Project
Noise-Sensitive Receptors Within 1 Mile (5,280 Feet) of Compressor Stations

Compressor Station	Receptor 1[1] Range (feet)	Receptor 2[1] Range (feet)	Receptor 3[1] Range (feet)
Piceance Creek Station[2]	N/A	N/A	N/A
West Gas Meeker Station	Community Building 1,800 (NW)	Residence 2,600 (SW)	Residence 3,400 (SW)
Rocky Mountain N.G. DeBeque Station	Residence 4,700 (SW)	Residence 4,800 (NW)	-----
West Gas DeBeque Station	Residence 1,900 (NE)	Residence 2,800 (NE)	Residence 3,300 (W)
Olathe Compressor Station[2]	N/A	N/A	N/A
Rocky Mountain N.G. Big Gypsum Compressor Station[2]	N/A	N/A	N/A
Rocky Mountain N.G. Maverick Compressor Station[2]	N/A	N/A	N/A
Dolores Compressor Station	Portable Trailer House 984 (SW)	Residence 1,260 (S)	Residence 1,395 (W)
Dolores Compressor Station (Alternate 1)	Portable Trailer House 315 (E)	Residence 840 (SE)	Residence 1,194 (SW)
Dolores Compressor Station (Alternate 2)	Residence 1,740 (NE)	Residence 1,770 (NE)	Residence 1,860 (E)
	Abandoned Ranch 1,050 (SE)	Summer Cabin 4,410 (SW)	Summer Cabin 4,440 (SW)

[1]Receptors are numbered by proximity to the compressor station.

[2]There were no known noise-sensitive receptors identified within 1-mile radius of the Piceance, Olathe, Big Gypsum, and Maverick sites.

TABLE 3-8

TransColorado Gas Transmission Project
State and Federal Haul Routes

State	Road Number	Segment	Projected Hauling Use[1]
Colorado	I-70	Rifle, CO to UT/CO border	Moderate
	US-50	Grand Junction, CO to Montrose, CO	Moderate
	US-50	Montrose, CO to Ridgeway, CO	Light
	US-160	Cortez, CO to Junction with CO 172	Light
	US-550	Durango to NM/CO border	Light
	US-666	UT/CO border to NM/CO border	Moderate
	CO-13	Rio Blanco to Rifle, CO	Light
	CO-62	Ridgeway, CO to Placerville, CO	Light
	CO-65	Junction I-70 to Mesa, CO	Light
	CO-90	Montrose, CO to Junction with CO 141	Light
	CO-140	Hesperus, CO to NM border	Light
	CO-141	Whitewater, CO to Dove Creek, CO	Light
	CO-145	Junction CO 141 to Cortez, CO	Light
	CO-146	Clifton, CO to Junction US-50	Light
	CO-184	Lewis, CO to Mancos, CO	Light
	CO-348	Delta, CO to Olathe, CO	Light
	US-6/24	I-70 Junction to I-70 Junction	Light
New Mexico	US-64	Farmington, NM to Bloomfield, NM	Light
	US-550	Shiprock, NM to CO/NM border	Moderate
	US-666	CO/NM border to Gallup, NM	Moderate
	NM-44	Bloomfield, NM to Aztec, NM	Light
	NM-170	Farmington, NM to CO/NM border	Light
	NM-173	La Plata, NM to Aztec, NM	Light
Utah	I-70	UT/CO border to Crescent Junction, UT	Moderate
	US-191	Crescent Junction, UT to Monticello, UT	Moderate
	US-666	Monticello, UT to CO/UT border	Moderate

Source: TransColorado 1991

[1]Number of trips.

Hauling Use Daily
0 - 10 = light
11 - 25 = Moderate
25 - 50 = Heavy

uranium processing mill in Grand Junction, Colorado (Leske 1990). The Cheney disposal site is part of the Uranium Mine Tailings Remedial Action Project (UMTRAP) being conducted by the U.S. Department of Energy (Table 1-2).

According to Woodward-Clyde Consultants (1990), the Colorado Division of Wildlife stream and lake databanks were searched for information on locations of known or suspected toxic sediments. This search revealed only one location crossed by the TransColorado pipeline with known pollutants in the sediments. This crossing is located on the San Miguel River at MP 151.1 on the proposed route. Information in the stream databank is not specific, but it lists mining operations as a source of the sediment contamination. Studies of mining-related pollution are currently being conducted on the Dolores River by BuRec. Several areas crossed by the pipeline have a long history of mining operations, and pollutants in sediments could potentially occur at other locations.

Licensed solid waste landfilling facilities have been identified in all potentially affected counties. Landfills are typically controlled by the county and accept non-hazardous wastes for a tipping fee.

SOCIOECONOMIC CONDITIONS

Population

Two counties, Mesa County in Colorado and San Juan County in New Mexico, have populations above 50,000. Dolores, Rio Blanco, and San Miguel Counties have 1989 populations estimated below 6,000. The remaining counties range between these high and low estimates. Larger urban areas along the proposed route and agency preferred routes include Durango with a 1989 population estimate of 12,836, Grand Junction with 32,346, Montrose with 10,530, and Farmington with 33,656 (1990 estimate - Colorado Division of Local Government 1990-1991).

Population density statistics indicate that all 10 counties are considered rural counties. Densities ranged from a high of 26.9 persons per-square-mile in Mesa County and a low of 1.5 persons per-square-mile in Dolores County (Bureau of the Census 1988).

Employment

The employment and income data for the project area illustrate that Mesa, La Plata, Garfield, and Montrose Counties in Colorado and San Juan County in New Mexico have the largest labor forces of the 10-county study area. Employment data indicate that the historical trend has been that of a declining labor force and employment, with increasing unemployment between 1985 and 1987. Increasing labor force and employment coupled with declining unemployment rates occurred generally between 1987 and 1989. Several exceptions to this trend were Delta, Montezuma, and Rio Blanco Counties, with a steadily declining labor force and employment, and San Miguel County with a steadily increasing labor force and employment for the same period (Colorado Division of Local Government 1990-1991))

Fiscal Conditions

Table 3-9 summarizes fiscal conditions in the potentially impacted counties. The figures provided give a general evaluation of the fiscal conditions of the 10 counties.

Total assessed valuation over the 5-year period indicates fluctuating county property values for each of the 10 counties. Garfield, Montrose, San Miguel, Montezuma, and La Plata Counties reported a net increase of assessed valuation over the 5-year period from 1985 to 1989. Conversely, Rio Blanco, Dolores, Delta, and Mesa Counties in Colorado and San Juan County in New Mexico have reported net decreases for the same period.

The states of Colorado and New Mexico assess the value of gas transportation pipelines to facilitate the consistent valuation of pipelines that cross several counties. Employing a cost approach, pipelines are assessed and value assigned to affected counties and taxing jurisdictions. Taxes are then levied based on assessed valuation.

Property and sales taxes also varied over the 5-year period, but generally increased with the

TABLE 3-9

TransColorado Gas Transmission Project
1989 County Government Statistics

County	Total Assessed Valuation (Thousands $)	State-Assessed Property Gas Transportation Pipelines (Thousands $)	Average Mill Levy	Property Tax Collected (Thousands $)	Sales Tax Collected (Thousands $)	County Revenues (Thousands $)	County Expenditure (Thousands $)	Surplus (Deficit)
Rio Blanco	277,690	16,714	70.6	13,951	190	9,017	7,399	1,618
Garfield	280,997	5,435	70	19,325	647	12,106	11,671	435
Mesa	426,183	4,230	85	11,209	7,814	49,631	47,440	2,191
Montrose	143,770	1,477	76	10,324	No county sales tax	11,292	11,673	(381)
Delta	86,340	15	80	7,451	1,386	9,776	9,590	186
Dolores	17,209	1,196	84	N/A	38	1,703	1,637	66
San Miguel	100,356	395	64	1,118	369	5,938	4,782	1,156
Montezuma	163,743	7,669	65	12,046	No county sales tax	8,554	7,786	758
La Plata	367,289	27,474	52	21,328	4,039	15,736	15,361	375
San Juan	1,475,288	—	25	29,649	4,236	23,066	21,788	1,278

Source: State Agencies, State Data Centers, County Assessors, Treasurers and Commissioners. 1990.

exception of Rio Blanco, Dolores, and Delta Counties. Montezuma County and Montrose County collect no sales tax.

County revenues and expenditures, included on Table 3-9, are an indication of county operating conditions. The data indicate that during the 5-year history, only Montezuma County did not operate in deficit. For the remaining counties, expenditures exceeded revenues 2 to 4 years during the 5-year period.

A portion of gas produced from the San Juan natural gas basin occurs on lands under the jurisdiction of representative Indian tribal councils. During the scoping process for the TransColorado Gas Transmission Project, the Southern Ute Indian tribe made claim that export pipeline capacities from the San Juan Basin to western and southwestern markets were currently being exceeded and that the implementation of the TransColorado proposal would increase this capacity shortfall.

Natural gas production on the Southern Ute Indian Reservation is operated by oil and gas companies such as Texaco, Arco, Meridian, and to a large extent by Amoco. This gas is produced for shipment along the Ignacio, Colorado/ Bloomfield, New Mexico pipeline corridor to be transported out of the region by El Paso Natural Gas or, if constructed, the proposed TransWestern pipelines.

The Southern Ute tribe receives royalties (12 to 25 percent of market value) and taxes (6.5 percent severance tax) on the gas produced on the reservation. The tribe claims that 90 percent of tribal revenue is generated by natural gas production (Cook 1991). The tribe estimates that by 1993, wells on their reservation will produce approximately 30 MMcfd of natural gas, or an average of 10.95 Bcf per year (Bruner 1991).

Public Services

A wide range of public services and facilities is offered in the 10-county study area. Larger, urbanized areas with adequate tax bases and populations are able to offer full-service law enforcement and fire districts, hospitals, emergency response service, water and sewer services, road and bridge departments, solid waste disposal, recreation programs, library systems, zoning ordinances, land use planning, and social services. Rural communities, however, often do not generate the revenue necessary to support such services. Frequently, residents in rural areas must travel to urbanized areas to utilize health care, governmental, and recreational services and facilities. In some cases, rural communities have established special taxing districts to fund desired services, such as fire protection, water treatment and supply, sewer services, and medical care facilities. Indian tribal governments and the BIA also provide services to reservation and tribal members.

Housing

Housing availability in the 10-county study area is illustrated in Tables 3-10 and 3-11. Table 3-10 indicates the most recent available data on total housing units and vacancy rates among these units. The vacancy rates describe rates for the entire inventory of rentals and owner occupied housing. Table 3-11 describes the temporary housing stock in the communities along the proposed route and agency preferred route.

The TransColorado Proposed Pipeline Project would require three construction crews (or spreads) during the building phase of the project. It is likely that the majority of workers would choose to reside in temporary housing, such as motels/hotels, or in mobile home and recreational vehicle areas. Rental or purchase of single-family homes, condominiums, or apartments is possible; however, it is not anticipated that a significant number of construction workers would purchase homes or rent units through a lease arrangement. Workers will not be allowed to use public recreation or camping areas.

Summer months are the typical busy season for the entire region with some of the smaller northern communities experiencing their busiest months during the fall hunting season. Winter weekends in the Durango area are also active. According to discussions with the individual county chambers of commerce and housing providers, most communities could absorb an influx of construction workers. Durango would be the exception, as this community is currently experiencing a housing crisis particularly in the rental stock. During months when Fort Lewis College is in session, vacancy rates for

TABLE 3-10

TransColorado Gas Transmission Project
Estimated Housing Units and Vacancy Rates (1989)

Location	Total Housing Units (number)	Vacancy Rate (percent)	Vacant Housing Units (number)
Delta County	9,397	7.23	679
Cedaredge	726	13.36	97
Delta	1,817	8.48	154
Orchard City	795	5.03	40
Dolores County	1,009	41.43	418
Garfield County	12,290	14.65	1,800
Parachute	401	6.23	25
La Plata County	15,835	26.98	4,273
Durango	5,108	4.97	254
Mesa County	40,772	13.09	5,339
De Beque	162	27.16	44
Grand Junction	14,422	0.42	61
Palisade	862	25.75	222
Montezuma County	7,675	22.18	1,702
Cortez	3,602	23.10	832
Dolores	369	2.71	10
Mancos	423	20.33	86
Montrose County	11,340	14.28	1,619
Montrose	4,303	3.28	141
Naturita	396	33.84	134
Nucla	462	34.85	161
Olathe	526	10.27	54
Rio Blanco County	3,027	38.52	1,166
Meeker	1,056	36.84	389
San Miguel County	2,440	27.50	671
Norwood	189	0.53	1
Sawpit	25	0.00	0
San Juan County	29,730	15.84	4,710

Source: Division of Local Government, Department of Local Affairs 1989.

Note: Estimates based on change of average household size for Colorado Municipalities according to March 1990 Community Profile Statistics (CPS) and March 1989 CPS: 2.76 and 2.62 for United States.

TABLE 3-11

TransColorado Gas Transmission Project
Estimates of Temporary Housing
Availability Along Pipeline Route

Location	Number of Hotel/Motel[1]	Number of Units	Number of RV Sites	Number of RV Spaces
Meeker	4	100	2	N/A
Grand Junction	32	2,143	6	N/A
Clifton	1	20	N/A	N/A
Palisade	1	15	N/A	N/A
Mesa	1	20	N/A	N/A
Delta	6	126	3	147
Orchard City			1	
Cedaredge	2	20	N/A	N/A
Durango	82	2,800	3	255
Montrose	15	431	4	
Naturita	1	50	N/A	N/A
Norwood	3	40	7	
Cortez	15	700	5	300
Dolores	3	47	5	200
Mancos	4	190	5	609
Farmington (Aztec, Bloomfield)	26	1,000	27	N/A

[1]Includes hotel/motel, condominiums, and cabins.

apartments and rental homes are typically very close to zero (Kennedy 1990).

Private Lands

As stated previously, Tables 2-1 and 2-8 in Chapter 2 indicate general property ownership by agency and private entities. A further analysis of private lands was conducted using property records obtained or transcribed by TransColorado from county ownership records. Parcels that would be crossed by the proposed route or agency preferred route have been grouped according to size. It has been assumed that parcels of more than 20 acres are rural in character and that parcels in this category would be either undeveloped or would support such activities as agriculture, ranching, forestry, and mineral development. Although parcels smaller than 20 acres could also support agriculture or ranching, it is assumed that these would be secondary land uses and that principal land use would tend to be residential. Sizes of parcels that would be crossed by the proposed route and agency preferred route indicate that 93 percent or 212 of the 227 parcels that would be crossed by the proposed route consist of 20 acres or more. The agency preferred route would cross a total of 265 parcels of which 92 percent or 244 parcels are 20 acres or larger.

In early January 1991, a residential housing inventory of the proposed natural gas pipeline project was completed by helicopter. Residential houses located within 500 feet of the ROW center line were identified and mapped on 1:24,000 USGS maps. This information is presented in Tables 2-2 and 2-10. Houses within 500 feet of the center line would be included in the activity area of the pipeline project, and in most cases, would be within view of the proposed pipeline. The data provided illustrate that the proposed route, and resultant interconnecting pipeline in the DeBeque area, would cross within 500 feet of 42 residences. The agency preferred route crosses within 500 feet of 66 residences.

ROUTE DIFFERENCES - PROPOSED ACTION AND AGENCY PREFERRED ALTERNATIVE

Table 2-17 (Chapter 2) compares the natural resources that would be crossed by the Proposed Action and the Agency Preferred Alternative in the Norwood area where the two routes differ. Table 2-18 (Chapter 2) compares the natural resources that would be crossed by the Proposed Action and the Agency Preferred Alternative in the Mancos Valley area. Following is a description of each of these areas.

Norwood Area

The Norwood area is generally a northward sloping low-elevation plateau incised by small drainages and low hills. The predominant land use is livestock ranching, which includes livestock grazing on rangeland, and production of hay on irrigated farmland. The small communities of Norwood and Redvale lie nearby. The southern portion of the area is rugged and mountainous. Vegetation communities consist of pinyon-juniper and sagebrush at lower elevations, and mountain shrubland, aspen, and mixed conifer at higher elevations.

Proposed Action

From MP 151.7, the proposed route follows an existing 10-inch natural gas pipeline southwest to MP 173. The Big Gypsum Compressor site and meter station would be constructed adjacent to the pipeline at approximately MP 165.7. The route crosses a series of low plateaus dissected by steep sided canyons, and basins with steep sides slopes. At MP 177, the route follows an existing road across the Disappointment Valley to the Ryman Creek drainage (MP 185). The Disappointment Valley is overlain by moderately saline soils which are dissected by moderately incised channels. The proposed route parallels the Ryman Creek channel for approximately 8 miles. The Ryman Creek drainage is dissected by young, actively eroding side channels, and is prone to landslides and mass wasting near the head of the drainage. From Ryman Creek drainage divide, the route angles southeast across

the Summer Creek drainage, where it connects with the major transmission line corridor and the agency preferred route near MP 208 (see maps in the back of this document).

Agency Preferred Alternative

Beginning at the Maverick compressor station (MP 151.7), the agency preferred route follows an existing 6-inch natural gas distribution line to MP 159. The gently sloping terrain is occupied by pinyon-juniper woodland. From MP 159, the route follows existing county roads for approximately 13 miles to MP 172. The route then parallels the ROW of the two large electrical transmission lines (230 kV and 345 kV) to MP 197, where the route rejoins the proposed route (see maps in the back of this document). The route would cross approximately 3 miles of the Lone Cone State Wildlife area, and would cross the steep side slopes of the upper Disappointment Creek Valley.

Table 2-17 compares the natural resources that would be crossed by the proposed and agency preferred routes in the Norwood area.

Differences

The major differences between the two route segments are as follows: The agency preferred route is shorter, requires less road improvements, crosses less incised channel terrain, crosses less key big game range, and crosses less bald eagle winter range. The agency preferred route crosses more private land, and more rocky/shallow soils. To use the agency preferred route, less National Forest Service System lands would need to be designated a utility corridor (See Appendix A).

Mancos Valley Area

The Mancos Valley is a relatively small valley in southwestern Colorado. The valley is approximately 10 miles wide at the west end, and narrows to less than 0.5 mile wide on the east end. This constriction has historically resulted in all utilities being routed through a narrow gap between the La Plata Mountains and high terrain to the south. This narrow gap is called Mancos Hill (see Figure 3-10 and the maps in the back of this document). Land use in the valley consists of the small community of Mancos, which supports surrounding livestock ranches, recreational home developments, a lumber mill, and tourist-based services. Federal Highway 160 traverses the valley in an east-west direction. State Highway 184 connects to Highway 160 at Mancos (see maps in the back of this document). Several electrical transmission lines and pipelines cross the valley in an east-west direction. Table 3-12 lists the facilities, the width of the ROW, and the product each carries.

Proposed Action

Starting at the Dolores Compressor Station Alternate Site 2 (MP 220), the proposed route extends southeast, crossing the Dolores River and adjacent plateau. At MP 227, the route crosses Lost Canyon, and then traverses a broad, relatively flat area of private land to MP 230. Here the route weaves in and out of a mixture of private and Forest Service lands to MP 234. Between MP 234 and 243 the proposed route crosses four major drainages (Chicken Creek, and West, Middle, and East Mancos Rivers) which represent steep canyon crossings. The Chicken Creek crossing is the most difficult because of unstable soils, steep slopes, and a deeply incised stream channel. The Mancos River crossings are also difficult, but less severe than Chicken Creek. The route segment ends at MP 246 near the summit of Mancos Hill.

Agency Preferred Alternative

Beginning at the Dolores Compressor Station Alternate Site 2 (MP 210), the agency preferred route follows the 230 kV electrical transmission line across the Dolores River canyon and Lost Canyon Creek to the Dolores Compressor Station site at MP 215 (see the maps in the back of this document). At MP 215 the route turns southeast, and follows an existing utility corridor through the Mancos Valley to Mancos Hill at MP 231, where this segment rejoins the proposed route. Four major stream and river crossings would be required for this segment. These include the steep canyons drained by the Dolores River and Lost Canyon. The other two crossings (Chicken Creek and West Mancos Rivers) are difficult but not as steep as the crossings associated with the proposed route located further upstream on these drainages.

TABLE 3-12

TransColorado Gas Transmission Project
Parallel Facilities Mancos Valley Area
Proposed Action and Agency Preferred Alternative

Western Area Power Authority 230 kV Powerline (ROW 125 ft)	Existing Northwest 26-inch Natural Gas Pipeline (ROW 75 ft)	Northwest Proposed Natural Gas Pipeline (ROW 50 ft)	Mapco 10-inch Oil Products Line (ROW 50 ft)	Shell 30-inch CO_2 Pipeline (ROW 60 ft)	Colorado Utilities 115 kV Power Line (ROW 125 ft)	Miles Parallel	ROW Width Without TransColorado Pipeline	ROW Width with TransColorado Pipeline
TransColorado Proposed Route								
X						9.3	125 feet	175 feet
Agency Preferred Route								
X						10.9	125 feet	175 feet
X						2.4	125 feet	175 feet
	X	X	X			0.3	175 feet	225 feet
	X	X	X	X		3.8	235 feet	285 feet
	X	X	X	X	X	1.0	360 feet	410 feet
	X	X	X			5.8	175 feet	225 feet
	X		X			2.7	125 feet	175 feet
	X		X	X		1.9	185 feet	235 feet

Source: TransColorado (1991)

Table 2-18 compares the natural resources that would be crossed by the proposed route and agency preferred route in the Mancos Valley Area. Table 3-12 compares the existing facilities in the Mancos Valley area that would parallel both routes.

Differences

The major differences between the proposed and agency preferred routes are as follows: The agency preferred route is shorter, it crosses less landslide area, timberlands, key elk range, irrigation ditches, and would require fewer road improvements. The agency preferred route crosses more private land, incised channels, farm land, bald eagle winter range, and highways. The preferred route parallels more miles of existing utility ROW, would cause more visual contrasts, passes near more residences and would not require designation of a new utility corridor on National Forest System lands (See Appendix A).

CHAPTER 3

Piceance Creek

Rio Blanco Co.
Garfield Co.

Roan Creek

Garfield Co.
Mesa Co.

Colorado River

DE BEQUE

Plateau Creek

PALISADE

Colorado River

GRAND JUNCTION

Mesa Co.
Delta Co.

Gunnison River

DELTA

Delta Co.
Montrose Co.

Dolores River

Mesa Co.
Montrose Co.

MONTROSE

Montrose Co.
Ouray Co.

Ouray Co.

NUCLA

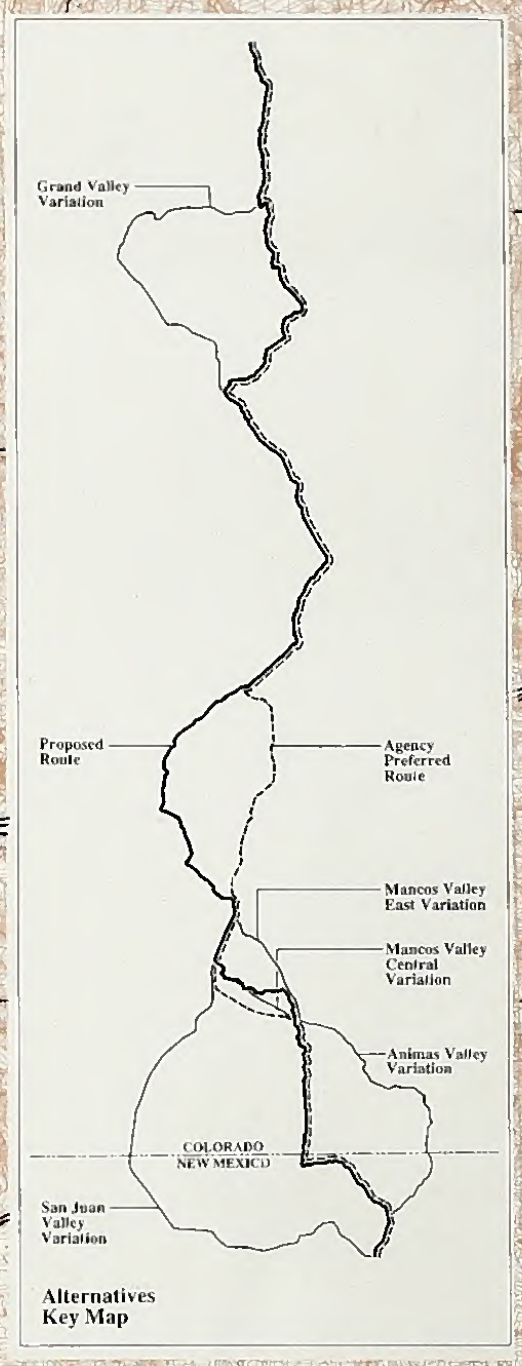
San Miguel River

Montrose Co.
San Miguel Co.

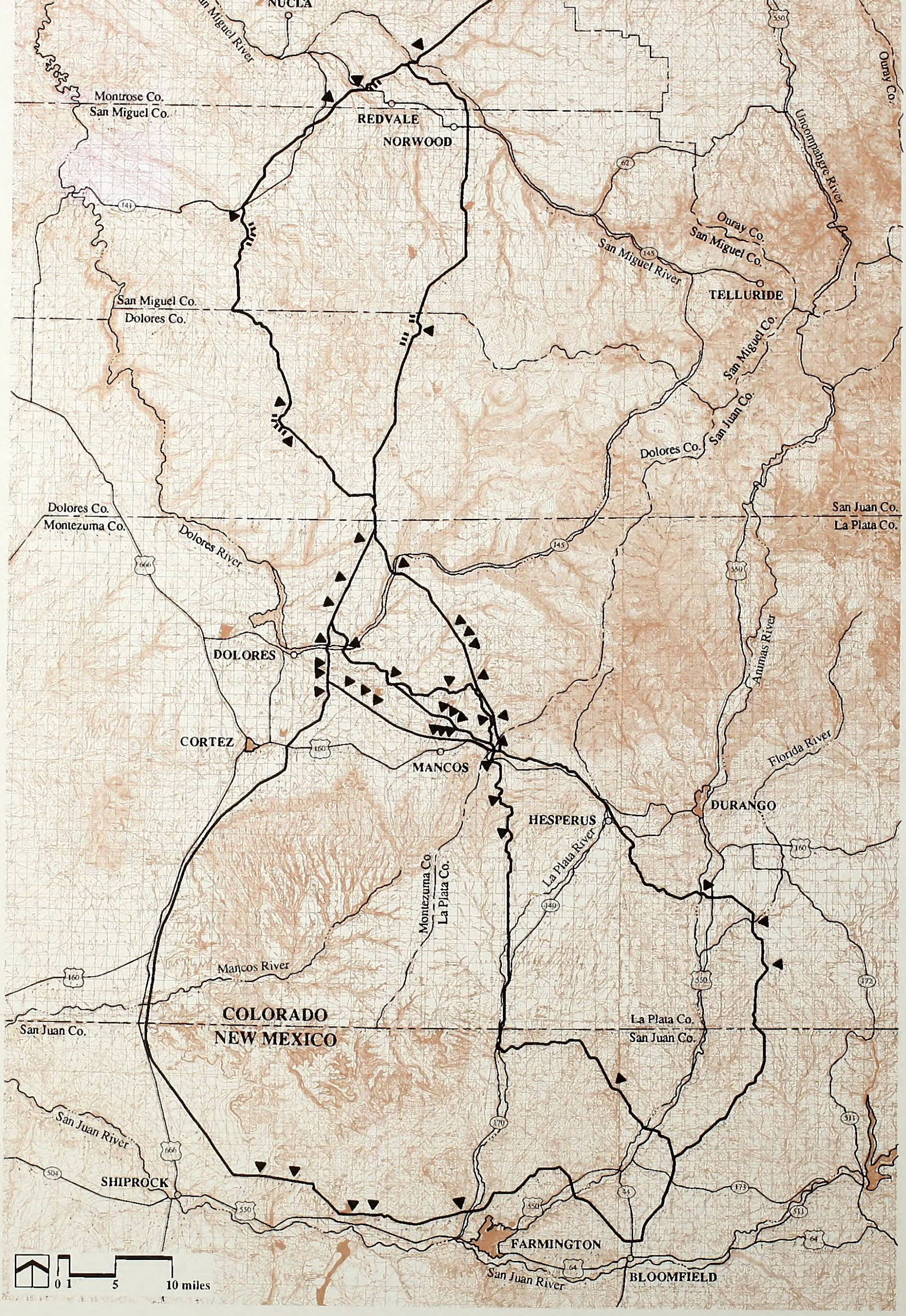
REDVALE

NORWOOD

Uncompahgre River



Alternatives
Key Map



SLOPES

FIGURE 3-1

▮▮▮▮▮▮▮▮ Slopes > 15 Percent

▼ Slopes ≥ 40 Percent

TRANSCOLORADO GAS TRANSMISSION PROJECT

Piceance Creek

Rio Blanco Co.
Garfield Co.

Roan Creek

Garfield Co.
Mesa Co.

DE BEQUE

Colorado River

Plateau Creek

PALISADE

Colorado River

GRAND
JUNCTION

Mesa Co.
Delta Co.

Gunnison River

DELTA

Delta Co.
Montrose Co.

Dolores River

Mesa Co.
Montrose Co.

MONTROSE

Montrose Co.
Ouray Co.

Ouray Co.

NUCLA

San Miguel River

Montrose Co.
San Miguel Co.

REDVALE

NORWOOD

Uncompahgre

Grand Valley Variation

Proposed Route

Agency Preferred Route

Mancos Valley East Variation

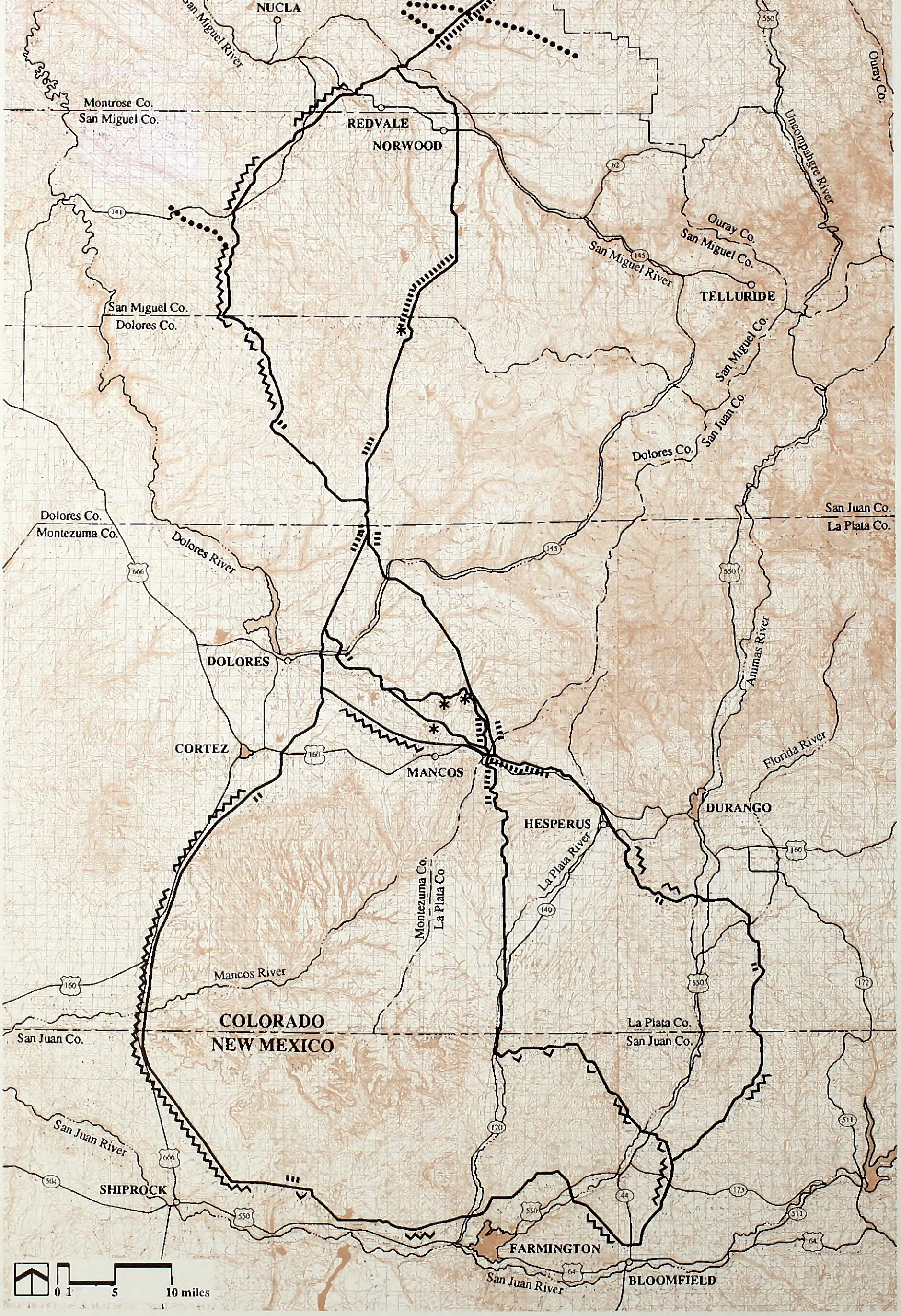
Mancos Valley Central Variation

Animas Valley Variation

COLORADO
NEW MEXICO

San Juan Valley Variation

Alternatives
Key Map



GEOLOGY
FIGURE 3-2

Active Landslide Area

Landslide Deposits

Incised Channel

Potentially Active Fault
(from Kirkham and Rogers 1981)

TRANSCOLORADO GAS TRANSMISSION PROJECT

Piceance Creek Gas Field

Sulfer Creek Gas Field

Coal Bed Methane Area

Piceance Creek

Rio Blanco Co.
Garfield Co.

Roan Creek

Garfield Co.
Mesa Co.

Colorado River

Logan Wash Gas Field

DE BEQUE

DeBeque Gas Field

Plateau Creek

Shire Gulch Gas Field

PALISADE

Colorado River

Plateau Gas Field

Coal Bed Methane Area

Mesa Co.
Delta Co.

GRAND JUNCTION

Gunnison River

DELTA

Delta Co.
Montrose Co.

Dolores River

Mesa Co.
Montrose Co.

MONTROSE

Montrose Co.
Ouray Co.

NUCLA

San Miguel River

Ouray Co.

Montrose Co.
San Miguel Co.

REDVALE

NORWOOD

Uncompahgre

Grand Valley Variation

Proposed Route

Agency Preferred Route

Mancos Valley East Variation

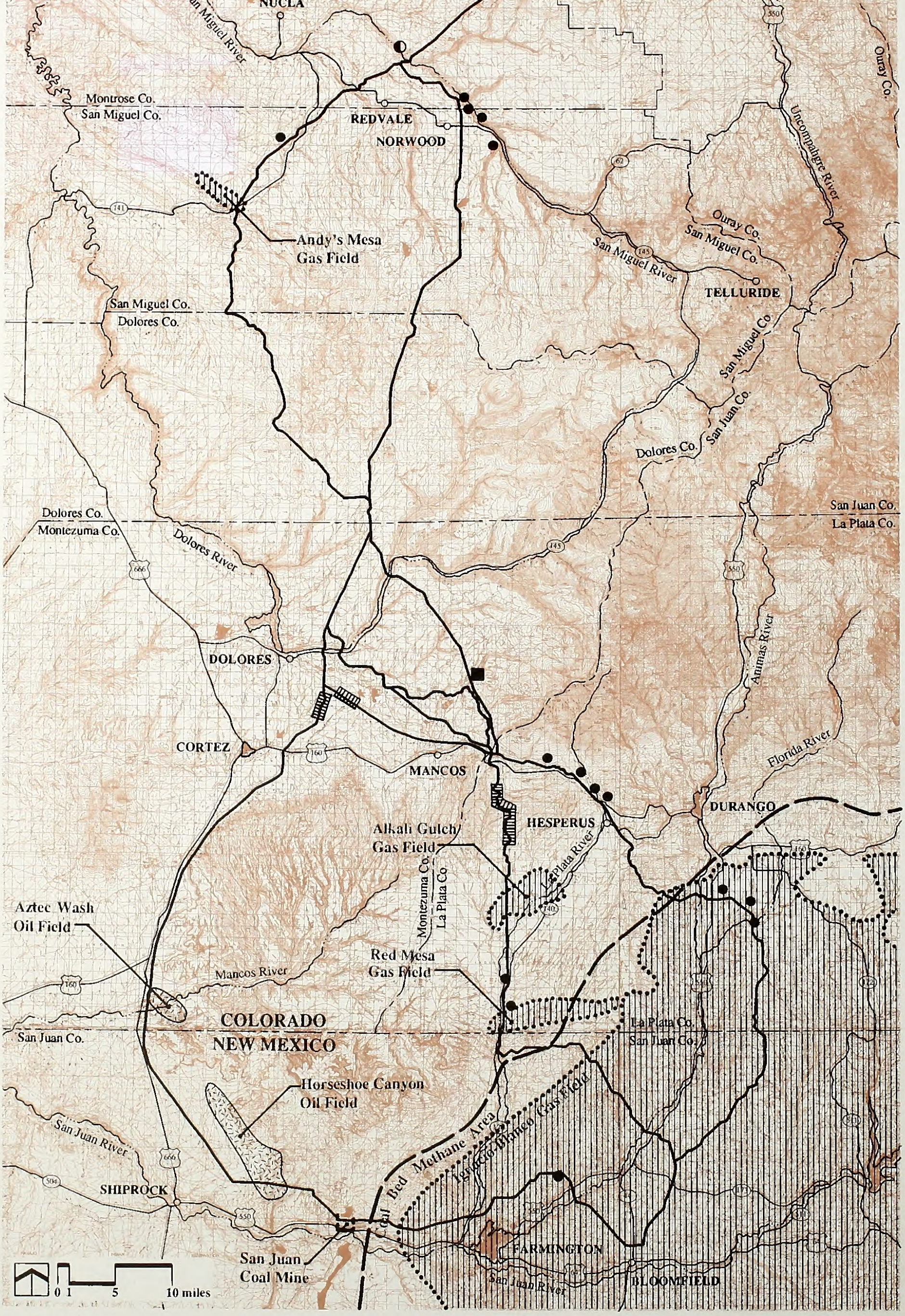
Mancos Valley Central Variation

Animas Valley Variation

COLORADO
NEW MEXICO

San Juan Valley Variation

Alternatives Key Map



MINERAL RESOURCES

FIGURE 3-3

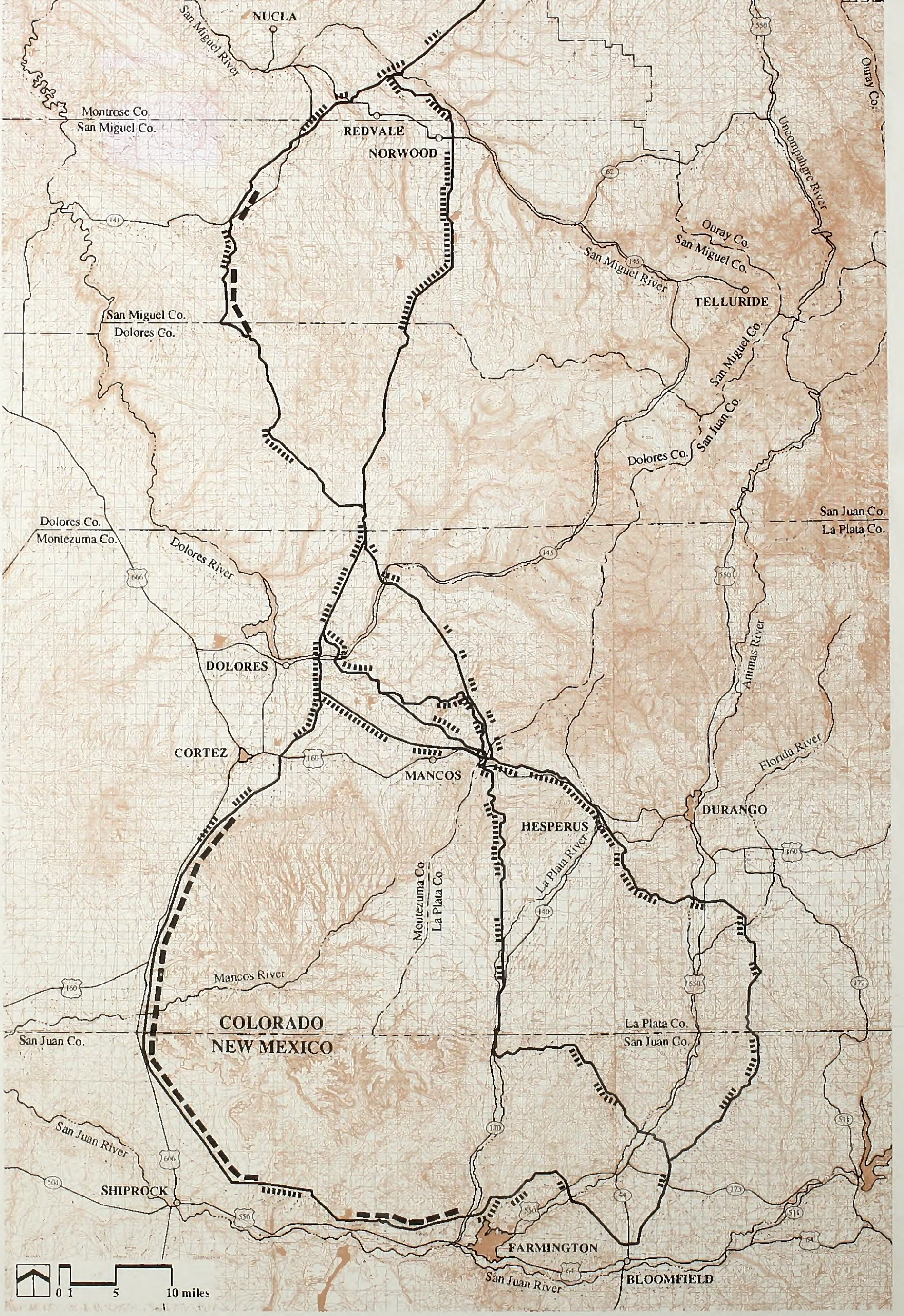
- Gravel Pit
- Clay Pit
- Placer Claim
- Crushed Stone
- Strippable Coal
- Gas Field
- Oil Shale: < 25 Gallons/Ton
- Oil Shale: > 25 Gallons/Ton
- Oil Field
- Coal Bed Methane Area

TRANSCOLORADO GAS TRANSMISSION PROJECT

Piceance Creek
Rio Blanco Co.
Garfield Co.
Roan Creek
Colorado River
Garfield Co.
Mesa Co.
DE BEQUE
Plateau Creek
Colorado River
PALISADE
GRAND JUNCTION
Mesa Co.
Delta Co.
Gunnison River
DELTA
Delta Co.
Montrose Co.
Dolores River
Mesa Co.
Montrose Co.
MONTROSE
Montrose Co.
Ouray Co.
San Miguel River
NUCLA
Montrose Co.
San Miguel Co.
REDVALE
NORWOOD
Ouray Co.
Uncompahgre R

Grand Valley Variation
Proposed Route
Agency Preferred Route
Mancos Valley East Variation
Mancos Valley Central Variation
Animas Valley Variation
COLORADO
NEW MEXICO
San Juan Valley Variation

Alternatives Key Map

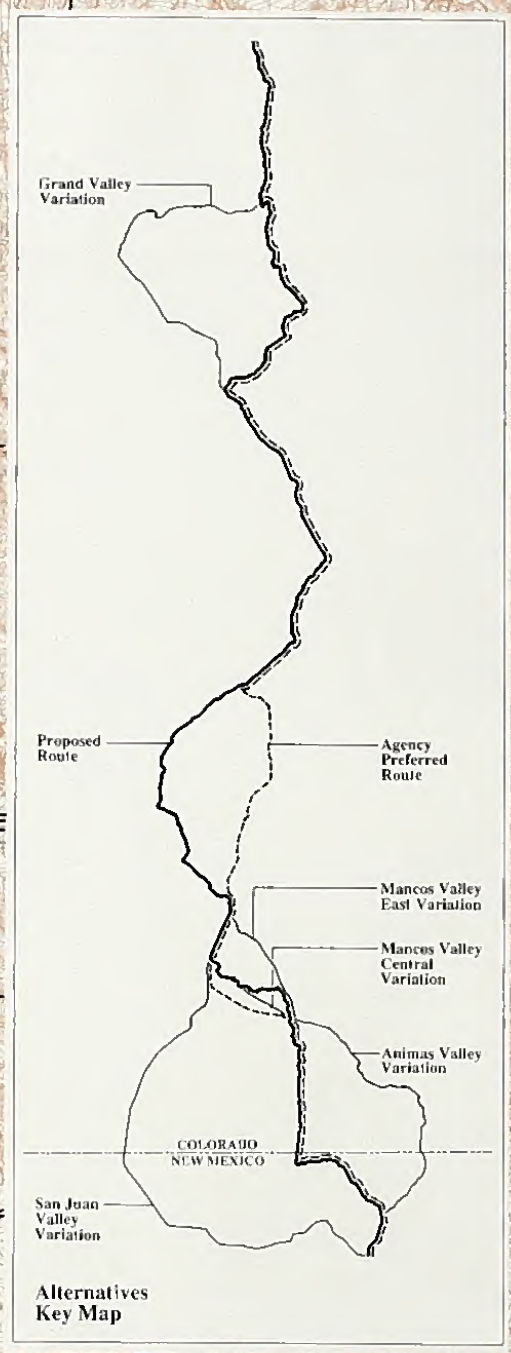


SOILS
FIGURE 3-4

Saline/Alkaline Soils

Rock/Shallow Soils and Wetland Soils

TRANSCOLORADO GAS TRANSMISSION PROJECT



Alternatives Key Map

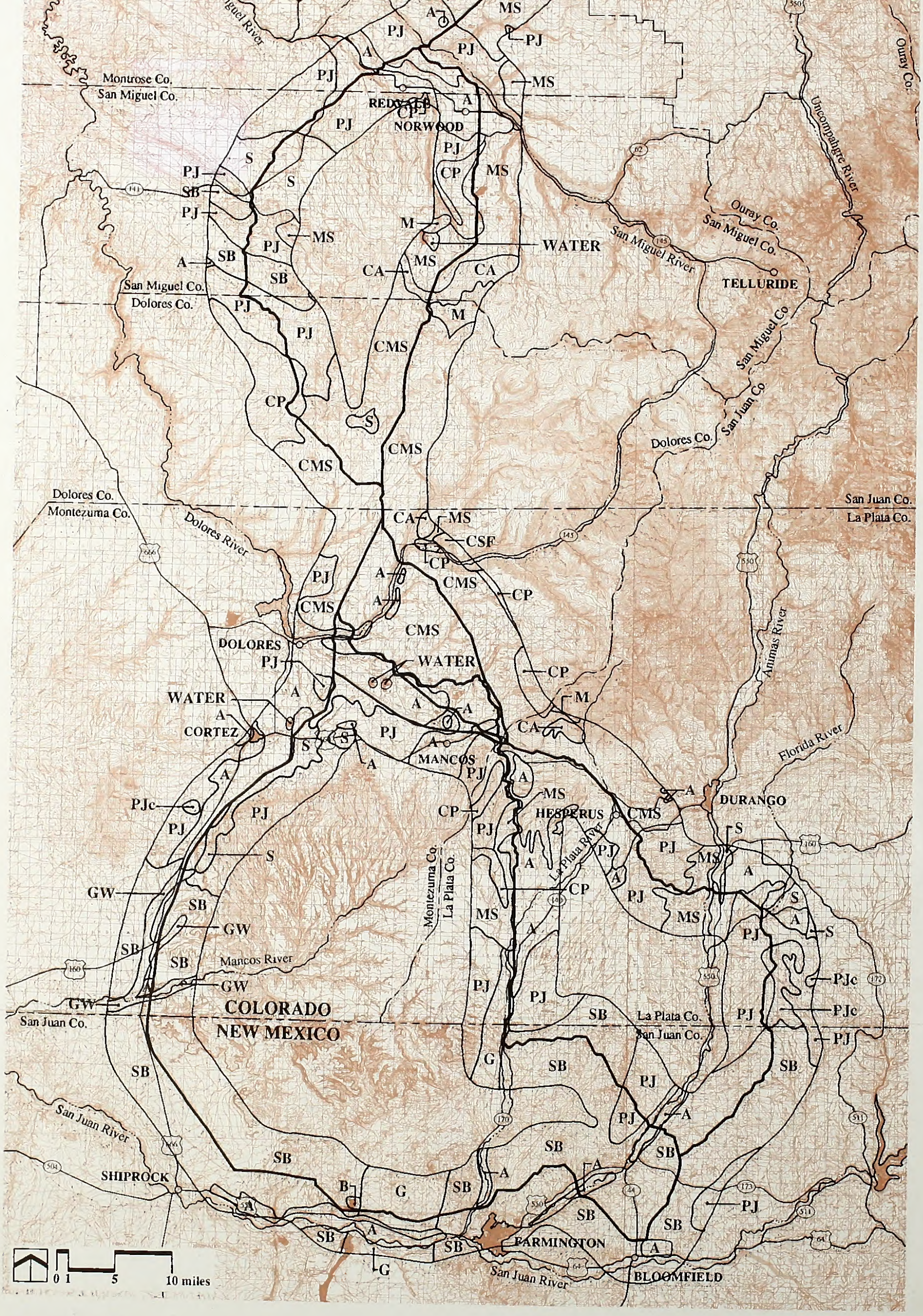
Rio Blanco Co.
Garfield Co.
Garfield Co.
Mesa Co.
Mesa Co.
Delta Co.
Montrose Co.
Mesa Co.
Montrose Co.
Montrose Co.
Ouray Co.
Montrose Co.
San Miguel Co.
Ouray Co.

Roan Creek
Piceance Creek
Colorado River
Colorado River
Plateau Creek
Gunnison River
Dolores River
San Miguel River
Uncompahgre R.

DE BEQUE
PALISADE
GRAND JUNCTION
DELTA
MONTROSE
NUCLA
REDVALE
NORWOOD

CDF
PJ
S
SB
A
MS
CP
G
CMS
CA
CSF,CA

139
70
6
65
141
50
92
133
550
62



VEGETATION

FIGURE 3-5

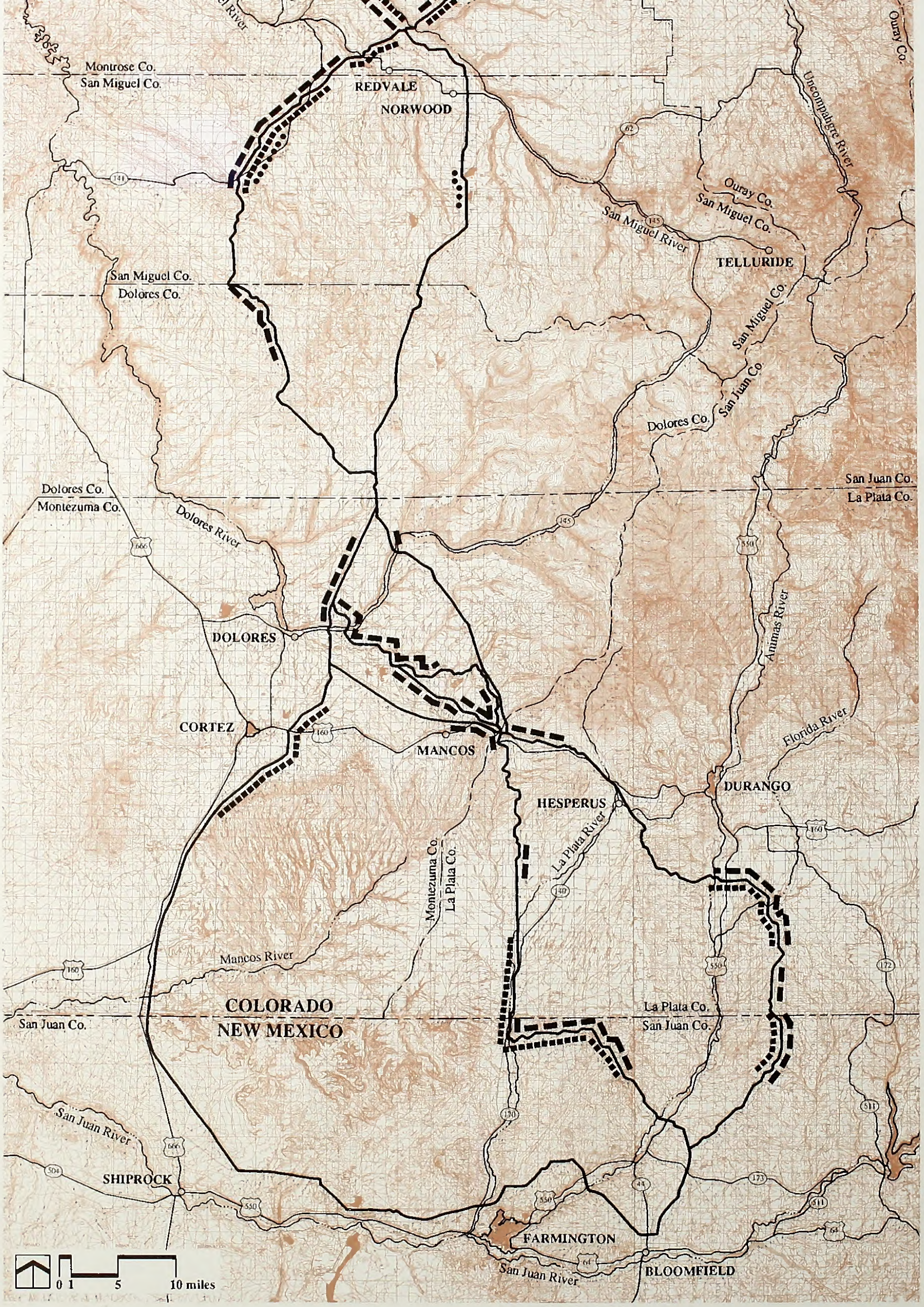
A	Agricultural Land	CP	Conifer-Pine	MS	Mountain Shrub
B	Barren	CSF	Conifer-Spruce/Fir	PJ	Pinyon Juniper
CA	Conifer-Aspen	G	Grassland	PJc	Pinyon Juniper (chained)
CDF	Conifer-Douglas Fir	GW	Greasewood	S	Sagebrush
CMS	Conifer-Mountain Shrub	M	Meadow	SB	Saltbrush

TRANSCOLORADO GAS TRANSMISSION PROJECT

Piceance Creek
Rio Blanco Co.
Garfield Co.
Roan Creek
Garfield Co.
Mesa Co.
Colorado River
DE BEQUE
Plateau Creek
Colorado River
PALISADE
GRAND JUNCTION
Mesa Co.
Delta Co.
Gunnison River
DELTA
Delta Co.
Montrose Co.
Dolores River
Mesa Co.
Montrose Co.
MONTROSE
Montrose Co.
Ouray Co.
San Miguel River
NUCLA
Montrose Co.
San Miguel Co.
REDVALE
NORWOOD
Ouray Co.
Uncompahgre

Grand Valley Variation
Proposed Route
Agency Preferred Route
Mancos Valley East Variation
Mancos Valley Central Variation
Animas Valley Variation
COLORADO
NEW MEXICO
San Juan Valley Variation

Alternatives Key Map



GAME ANIMALS

FIGURE 3-6

- Key Elk Range*
- Key Mule Deer Range*
- Key Pronghorn Range*
- Key Sage Grouse Nesting/Breeding Area

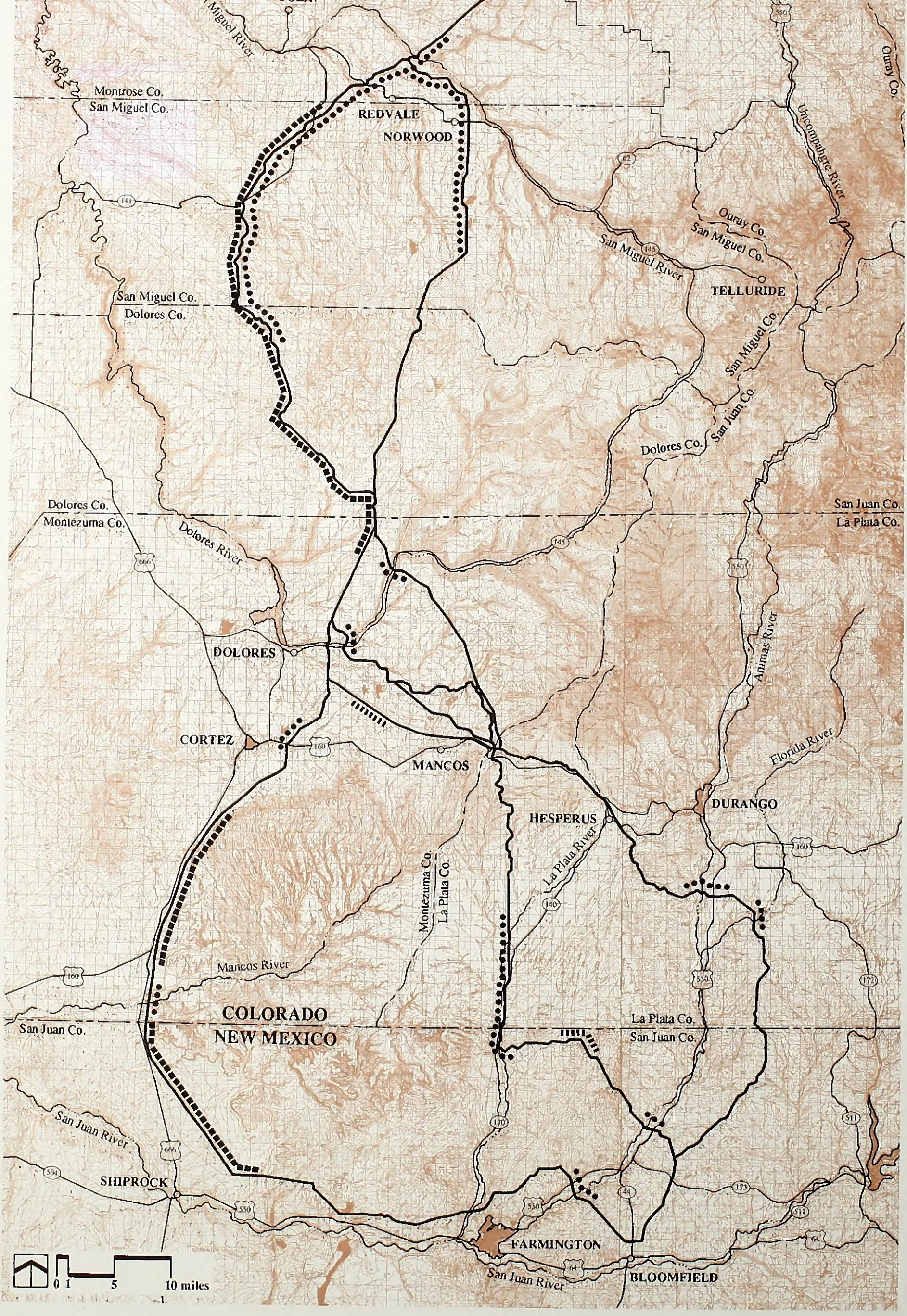
* Key Range consists of Severe Winter Range, Winter Concentration Areas, Fawning and Calving Areas and Critical Habitat.

TRANSCOLORADO GAS TRANSMISSION PROJECT

Piceance Creek
Rio Blanco Co.
Garfield Co.
Roan Creek
Garfield Co.
Mesa Co.
Colorado River
DE BEQUE
Plateau Creek
Colorado River
PALISADE
GRAND JUNCTION
Mesa Co.
Delta Co.
Gunnison River
DELTA
Delta Co.
Montrose Co.
Dolores River
Mesa Co.
Montrose Co.
MONTROSE
Montrose Co.
Ouray Co.
NUCLA
San Miguel River
Montrose Co.
San Miguel Co.
REDVALE
NORWOOD
Ouray Co.
Uncompahgre

Grand Valley Variation
Proposed Route
Agency Preferred Route
Mancos Valley East Variation
Mancos Valley Central Variation
Animas Valley Variation
COLORADO
NEW MEXICO
San Juan Valley Variation

Alternatives Key Map

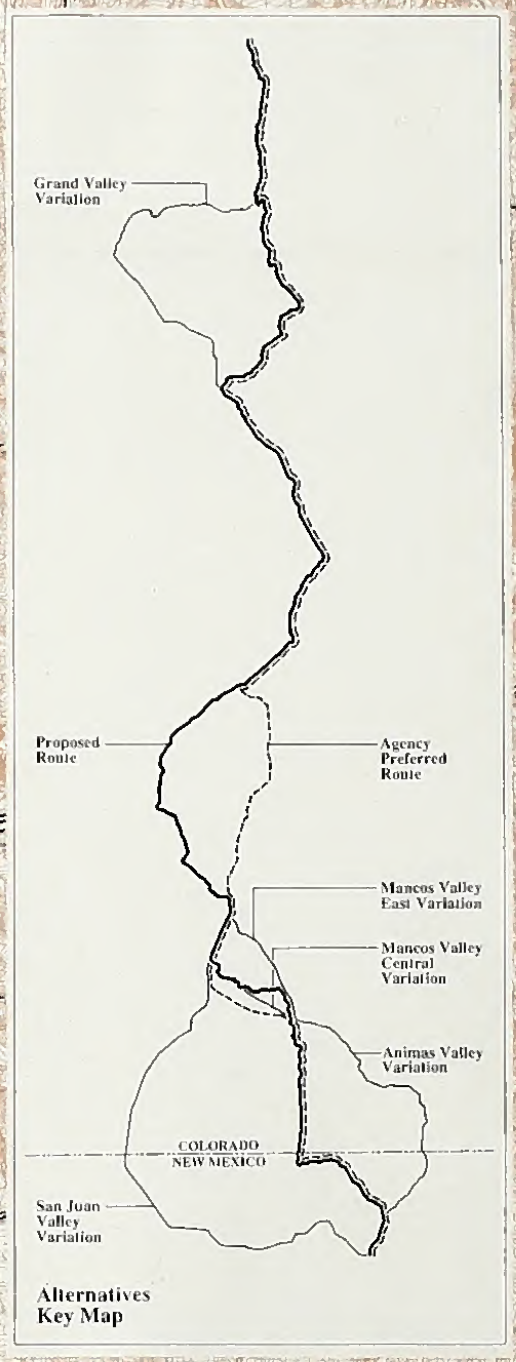


SENSITIVE WILDLIFE SPECIES
FIGURE 3-7

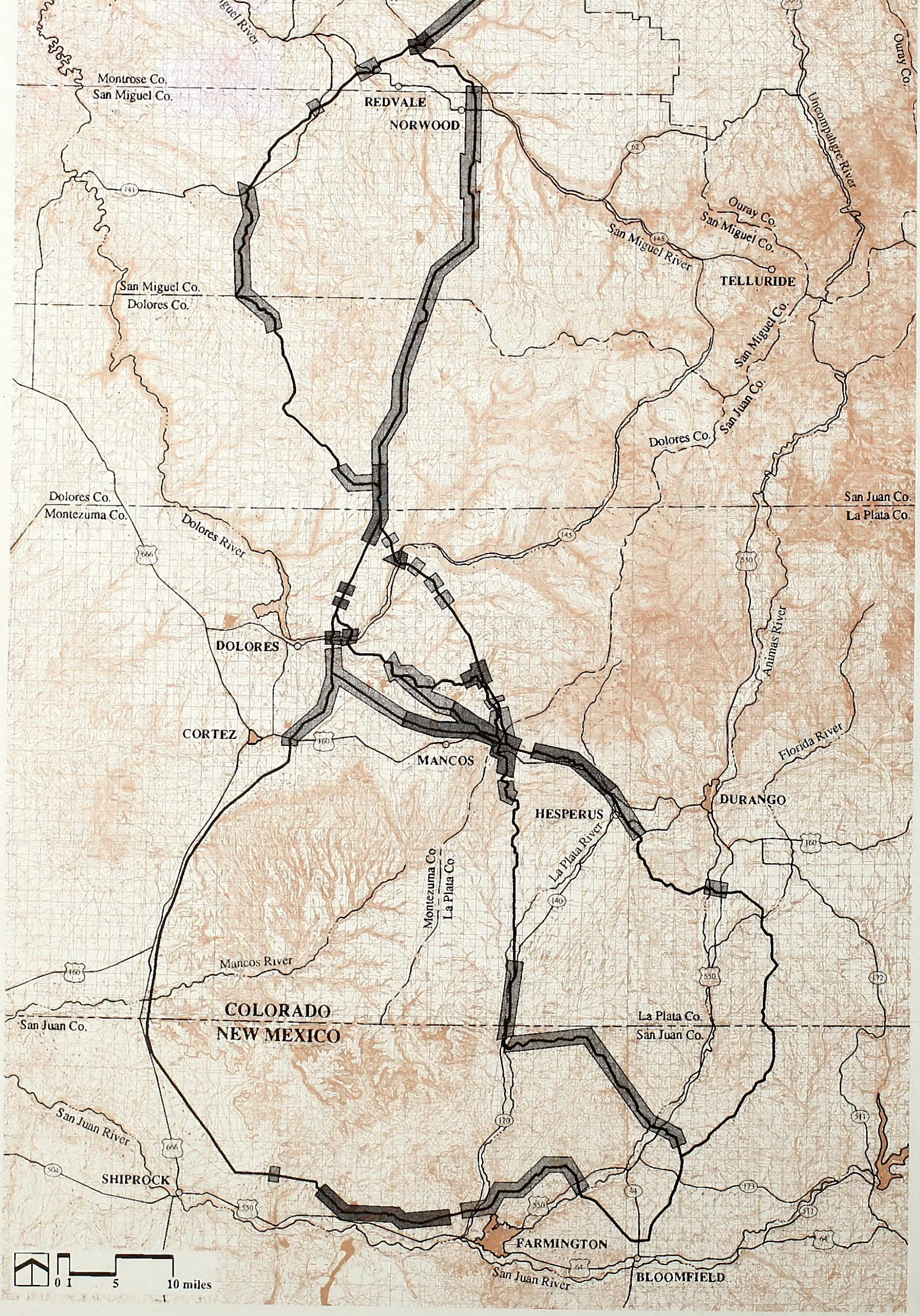
- Great Blue Heron Rookery
- Threatened and Endangered Fish Habitat
- Raptor Nesting Areas
- Bald Eagle Winter Range
- Potential Black-Footed Ferret Habitat (Prairie Dog Towns)

TRANSCOLORADO GAS TRANSMISSION PROJECT

Piceance Creek
Rio Blanco Co.
Garfield Co.
Roan Creek
Garfield Co.
Mesa Co.
Colorado River
DE BEQUE
Plateau Creek
Colorado River
PALISADE
GRAND JUNCTION
Mesa Co.
Delta Co.
Gunnison River
DELTA
Delta Co.
Montrose Co.
Dolores River
Mesa Co.
Montrose Co.
MONTROSE
Montrose Co.
Ouray Co.
NUCLA
San Miguel River
Montrose Co.
San Miguel Co.
REDVALE
NORWOOD
Ouray Co.
Uncompahgre



Alternatives
Key Map



VISUAL RESOURCE MANAGEMENT OBJECTIVES

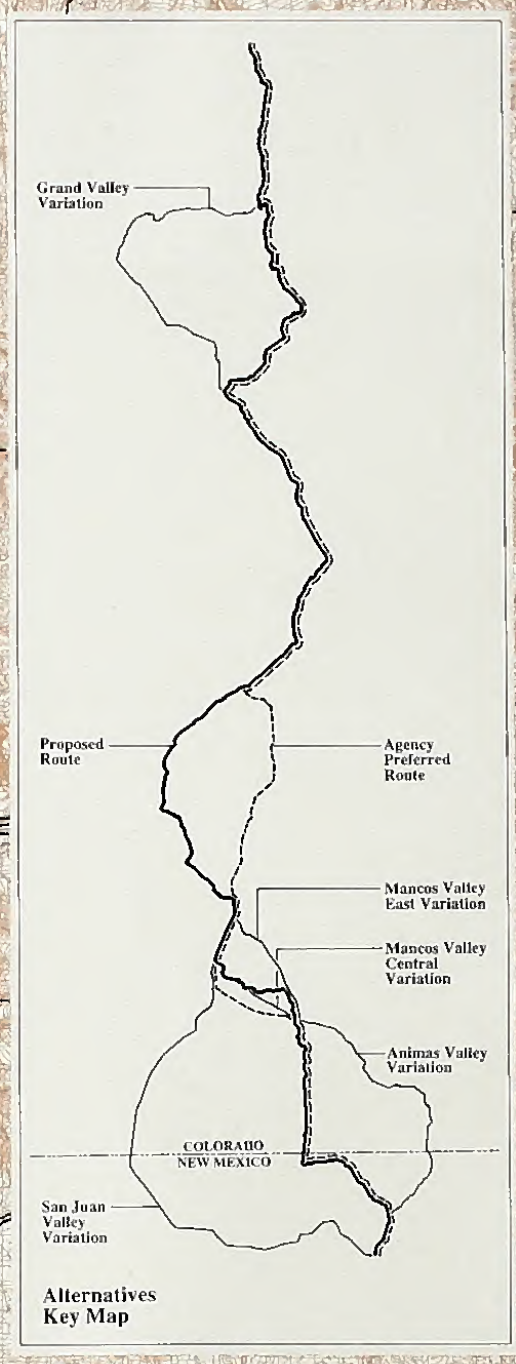
FIGURE 3-8

VRM Class/VQO

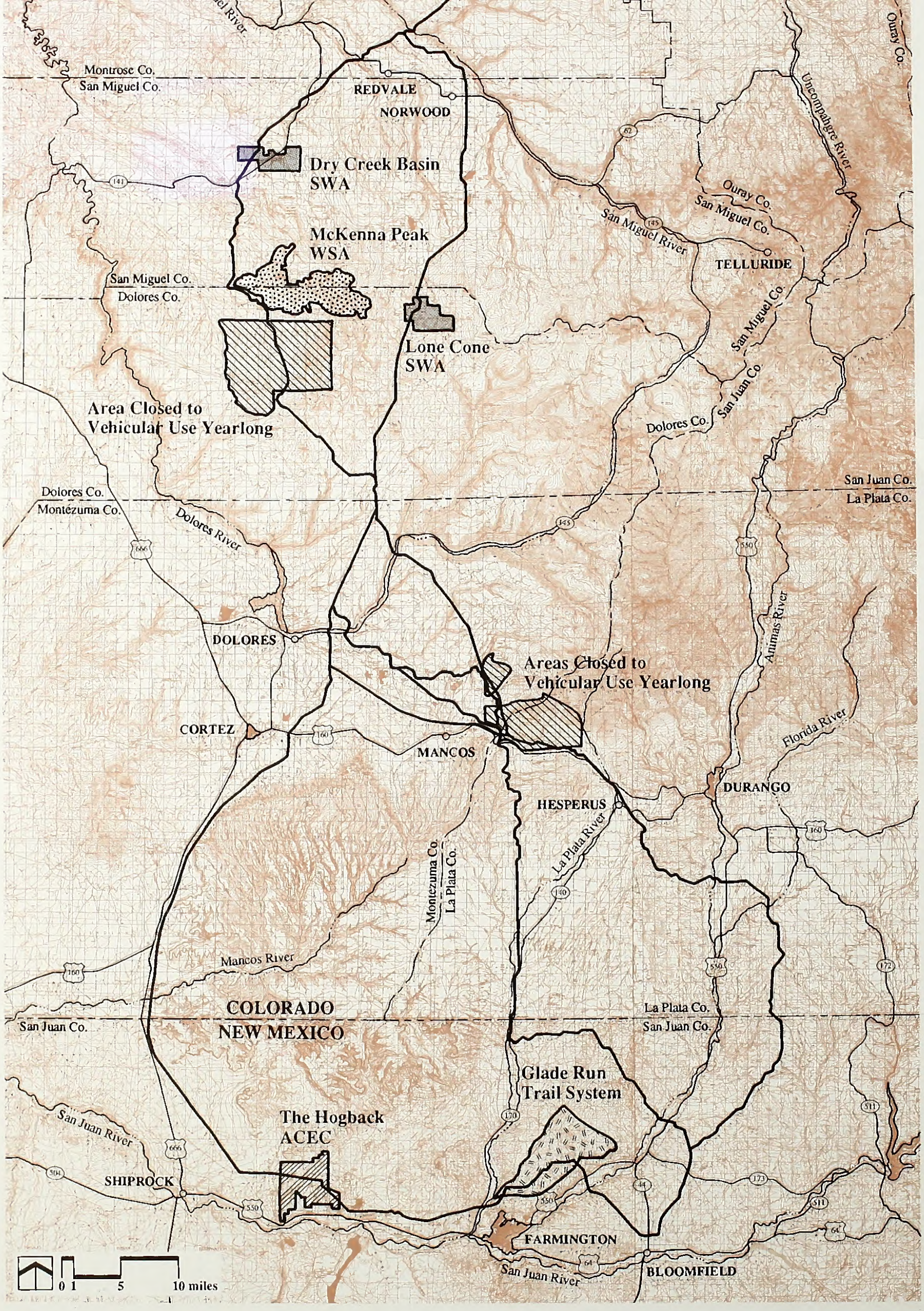
- II/Retention Most Sensitive
- III/Partial Retention
- IV/Modification

TRANSCOLORADO GAS TRANSMISSION PROJECT

Dudley Bluffs RNA
Piceance Creek
139
Rio Blanco Co.
Garfield Co.
Roan Creek
Colorado River
70
6
Garfield Co.
Mesa Co.
DE BEQUE
139
Plateau Creek
Colorado River
70
6
PALISADE
65
Mesa Co.
Delta Co.
GRAND JUNCTION
141
Gunnison River
50
DELTA
133
92
Escalante SWA
Delta Co.
Montrose Co.
Dolores River
Mesa Co.
Montrose Co.
MONTROSE
50
Montrose Co.
Ouray Co.
141
San Miguel River
NUCLA
550
Ouray Co.
Montrose Co.
San Miguel Co.
REDVALE
NORWOOD
Uncompahgre



Alternatives Key Map



SPECIAL MANAGEMENT AREAS
FIGURE 3-9

- Forest Service Special Closure Areas
- ACEC Area of Critical Environmental Concern
- WSA Wilderness Study Area
- SWA State Wildlife Area
- RNA Research Natural Area
- BLM Special Recreational Area

TRANSCOLORADO GAS TRANSMISSION PROJECT

MANCOS VALLEY EXISTING UTILITY CORRIDORS

Topographic Constraints

Steep Terrain

Stream Canyons

Corridors

No Parallel Facilities
TransColorado Proposed Route

345 KV Transmission Line Corridor
Mancos Valley East (no cleared ROW)

Pipeline Corridor

Facilities in Corridor	1	2	3	4
TransColorado Agency Preferred Route	■	■	■	■
Mapco Products	■	■	■	■
Northwest Pipeline Existing	■	■	■	■
Northwest Pipeline Proposed	■	■		
Shell CO_2	■			■
Colorado-Ute 115 KV (300 feet from edge of pipeline corridor)	■			

Transmission Line Corridor

Facilities in Corridor	A	B	C	D	E
TransColorado Proposed	■				
TransColorado Agency Preferred	■	■	■[1]		
Colorado-Ute 115 KV	■	■	■	■	■
Shell CO_2				■	

See attached Table for detailed information

[1] Agency preferred route is within 300 feet of the edge of the transmission line corridor

FIGURE 3-10

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Chapter 4 analyzes the environmental consequences of implementing the Proposed Action, the Agency Preferred Alternative, and the No Action Alternative. Only the resources that were considered issues are presented here. Impacts to paleontological resources, groundwater, wilderness areas, locatable minerals, and threatened and endangered species were raised as issues during scoping. These issues were dropped after further analysis and, therefore, are not included here. The impacts to vegetation are addressed under wetlands, wildlife, water quality and quantity, soils, livestock, and visual resources. The scoping discussion in Chapter 1 gives the rationale for dropping these issues from further analysis in this draft EIS.

At this time, five route variations are being considered as replacements for portions of pipeline routes under the Proposed Action and Agency Preferred Alternative. Descriptions of these route variations and associated environmental impacts are located in Appendix B.

Assumptions and Guidelines

The following assumptions and guidelines apply to the analysis of the Proposed Action and the Agency Preferred Alternative.

Assumptions

1. TransColorado would comply with all applicable laws and regulations.
2. The pipeline and associated compressor facilities would be constructed as described in Chapter 2 of this document.
3. TransColorado would comply with environmental protection measures and agency stipulations set forth in Chapter 2 of this document.
4. A ROW of 75 feet in width would be cleared (even though TransColorado will use a portion of existing cleared utility ROWs for work space at many locations).
5. No additional routine surface disturbance activities would be required along the operational ROW based on the commitment by TransColorado to allow woody native vegetation to re-establish on the operational ROW.

Guidelines

1. The extent and duration of construction and operation effects on particular resources were estimated. Short-term impacts were considered to be those impacts lasting fewer than 5 years from the time of construction disturbance. Impacts to wildlife and fisheries were considered long-term if they lasted beyond one reproductive cycle, and short-term if they lasted less than one reproductive cycle.
2. Assessment of operational impacts was confined to those resources that are expected to be affected by long-term operational activities. These include climate, air quality, noise, wildlife, fisheries, and socioeconomic conditions.
3. Impacts of abandonment were not analyzed in detail for any resource in this EIS because the impacts of abandonment would be very minor. Decommissioning and removing the compressor stations, and regrading and revegetating the access roads and compressor station pads would restore approximately 30 acres to former land uses (rangeland).

PROPOSED ACTION

Impacts to Air Quality

Construction

Operation of the pipeline construction equipment would increase local concentrations of air pollutants for the short term. Pollutant emissions per day would consist of approximately 9 tons of carbon monoxide, 0.4 ton of unburdened hydrocarbons, 0.1 ton of particulate matter, 1.8 tons of nitrous oxides, and 0.1 ton of sulfur dioxide. Actual concentrations of these pollutants in the air cannot be easily estimated because the equipment in the spread is constantly moving. These pollutants would be emitted by the pipeline spreads for a total construction period of approximately 216 days (assuming a construction rate of 1.4 miles per day). The daily fuel combustion emissions per mile from these activities are estimated to be equivalent to those emitted from a typical major urban street.

Grading, equipment movement, trenching, and backfilling would increase fugitive dust levels near the pipeline ROW, and on compressor station sites for the short term. Pipeline construction is expected to generate approximately 0.4 ton of fugitive dust per day for an estimated construction period of 216 days; compressor station construction is expected to generate 0.1 ton of fugitive dust per day for a 90-day construction period at each site.

Operation

Natural gas combustion to power compressor engines would increase the concentrations of air pollutants in the vicinity of each of the seven compressor stations for the long-term (50 years). The pollutants released would be primarily carbon monoxide (CO) and oxides of nitrogen (NO_x), with lesser quantities of other pollutants.

Table 2-6 (Chapter 2) provides a summary of expected emissions from the various compressor stations along the proposed route. The emissions portrayed in this table represent new sources and a modified source for the TransColorado project. The Rocky Mountain-DeBeque station shows total NO_x emissions estimated to be approximately 255 tons per year (tpy). This represents 127.5 tpy from two existing 600 horsepower reciprocating engines installed prior to 1980 and two add-on 600 horsepower engines to support the project. The existing Rocky Mountain-Debeque compressor station to which additional compression would be added for the TransColorado project is currently in compliance with applicable Colorado air quality regulations.

National Air Quality Standards

Table 4-1 provides a summary of the expected maximum concentrations of NO_2 and CO at the various compressor stations. All predicted concentrations are well below their respective National Ambient Air Quality Standards (NAAQS) using very conservative screening model techniques.

Maximum ground level 1- and 8-hour carbon monoxide concentrations (267 and 187 micrograms/cubic meter) are expected within 0.1 mile of the Westgas-Meeker compressor station. These values represent 2.3 and 1.6 times the estimated annual background level of 115 micrograms/cubic meter. However, when these maximum project-related concentrations are combined with average background levels, the combined concentrations represent 2 percent or less of the 1-hour standard of 40,000 micrograms/cubic meter, and 8-hour standard of 10,000 micrograms/cubic meter. Expected concentrations at other stations would be even less.

The maximum ground level nitrogen dioxide concentration (44 micrograms/cubic meter) is expected within 0.2 mile of the Rocky Mountain-DeBeque compressor station. This value represents 11 times the estimated background level of 4 micrograms/cubic meter. However, when this maximum project-related concentration is combined with average background levels, the combined concentration represents 50 percent of the annual air quality standard of 100 micrograms/cubic meter. Estimated concentration values decrease rapidly beyond 0.2 mile from the source. Again, expected concentrations at other stations would be less.

TABLE 4-1

TransColorado Gas Transmission Project
Air Quality Impacts at Proposed Compressor Station Sites ($\mu g/m^3$)

Compressor Station	Pollutant	Averaging Time	Ambient Air Quality Standard ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$)
Questar-Piceance[1]	NO_2	Annual	100	34.5
	CO	1-hour	40,000	31.0
		8-hour	10,000	21.7
WestGas-Meeker[1]	NO_2	Annual	100	18.3
	CO	1-hour	40,000	266.5
		8-hour	10,000	186.5
Rocky Mountain-DeBeque[1,3]	NO_2	Annual	100	44.0
	CO	1-hour	40,000	56.0
		8-hour	10,000	39.2
WestGas-DeBeque[1]	NO_2	Annual	100	8.8
	CO	1-hour	40,000	141.9
		8-hour	10,000	99.3
TransColorado-Olathe[1]	NO_2	Annual	100	2.11
	CO	1-hour	40,000	1.54
		8-hour	10,000	1.07
Rocky Mountain-Big Gypsum[2]	NO_2	Annual	100	5.3
	CO	1-hour	40,000	6.7
		8-hour	10,000	4.7
Dolores Alternate 1[2]	NO_2	Annual	100	5.60
	CO	1-hour	40,000	69.97
		8-hour	10,000	48.98
Dolores Alternate 2[2]	NO_2	Annual	100	5.60
	CO	1-hour	40,000	69.97
		8-hour	10,000	48.98

[1] COMPLEX I

[2] SCREEN

[3] Rocky Mountain-DeBeque is an existing compressor station. The maximum predicted concentrations due to increases in emissions from proposed modifications at this site are one half of the maximum predicted concentrations indicated in the table.

Based on a comparison of the Class II PSD increment for annual NO_2 impact of 25 $\mu g/m^3$ with the predicted concentrations in Table 4-1, the Rocky Mountain-DeBeque station shows a potential exceedance. PSD permit requirements will apply to the Rocky Mountain-DeBeque station if the additional compressor capability is determined by the State of Colorado to be a "major modification." However, this potential exceedance is based on first order, conservative screening model only use. Additional detailed, and more realistic modeling should show lower potential impacts. Permit application review by the State of Colorado may require specific emission control equipment or other operation procedures. For example, new reciprocating compressor stations are available with approximately one-third lower NO_x emissions, turbine compressor stations would emit about one-half less NO_x emissions, and selective catalytic controls (although untested) may provide 90 percent control. All operations must comply with applicable local, state and Federal air quality regulations.

Similarly, the predicted NO_2 impact from the Questar-Piceance station appears to exceed the PSD Class II increment. Since potential emissions are less than 250 tons per year, this source would not be required to obtain a PSD permit. However, this source will consume NO_2 increment and, if an increment violation is expected to occur, this station would not be approved for construction.

Mesa Verde

Estimated NO_2 concentrations at the nearest Mesa Verde National Park boundary resulting from operation of the Dolores Alternate 2 Station would be 1.22 micrograms/cubic meter, which is below the annual PSD Class I increment of 2.5 micrograms/cubic meter; operation of the Dolores Alternate 1 station would result in a concentration of 0.6 micrograms/cubic meter, which is also below the PSD Class I increment.

The cumulative NO_2 impact of multiple NO_2-generating sources within the southwest Colorado region is currently a topic of investigation among regulatory agencies. A brief discussion of existing and foreseeable cumulative sources and anticipated changes in regional air quality are discussed under Cumulative Impacts in this chapter.

An analysis of plume visibility impacts at the Mesa Verde National Park boundary was conducted using an EPA Level 1 screening model (VISCREEN) that provides an initial estimate of plume effects on a PSD Class I area such as Mesa Verde National Park. Results of this analysis indicate that the Dolores Alternate 2, which is on the portion of the proposed pipeline route nearest to Mesa Verde National Park, failed the screening assessment. This finding indicates that the compressor station plume could be visible to viewers within the park. The Dolores Alternate 1 Station passed the screening assessment and, consequently, is not expected to generate a visible plume within the park.

Several uncommitted mitigation measures are available to reduce or eliminate the potential visibility impacts to Mesa Verde National Park from the operation of Dolores Alternate 2 compressor station. These measures are described in the Uncommitted Mitigation section of this chapter. These measures include emission reduction controls at the compressor station (such as new reciprocating compressors which could lower NO_x emissions by approximately one-third, turbine compressors which emit about one-half less NO_x, and possible 80 to 90 percent control by untested selective catalytic controls) or installation of a different power source (such as electrical turbines which would eliminate NO_2 emissions from this location.) Additional studies will be conducted between the draft and final EISs to provide a more refined plume visibility analysis and to further evaluate recommended mitigation measures. If it is found that after application of technically achievable mitigation measures the Dolores Alternate 2 compressor station would not meet National Park Service and State of Colorado visibility requirements, this site would not be approved by the Department of Interior for construction, and the Dolores Alternate 1 site would have to be used.

Nitrate deposition rates within Mesa Verde National Park were estimated from project-related atmospheric $N0_2$ concentrations at the nearest park boundary. Annual nitrate deposition was estimated to be 0.2 kg/hectare-year for the Dolores Alternate 2 station and 0.1 kg/hectare-year for the more distant Dolores

Alternate 1 station. These estimated deposition rates would represent 2 to 4 percent of the background deposition rate of 5 kg/hectare-year. The effects on park soils, vegetation, and cultural resources from this level of atmospheric deposition have not been quantified. It is possible that additional nitrate could increase the growth rates and respiration of soil microorganisms, and that vegetation could grow at a faster rate.

Conclusion. Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 216 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites. The daily fuel combustion emissions per mile from these activities are estimated to be equivalent to those emitted from a typical major urban street.

Operation of seven compressor stations would increase the local (within 1 mile) concentrations of nitrogen dioxide and carbon monoxide. These increases would range from 2.3 times the annual average background levels for carbon monoxide to 11 times the annual average background levels for nitrogen dioxide. No pollutant concentration would exceed 50 percent of the applicable national air quality standard. Based on first-order, conservative screening analyses, the Questar-Piceance and Rocky Mountain-DeBeque stations show a potential exceedance of the Class II NO_2 increment. Additional detailed, and more realistic modeling should show lower potential impacts. A plume visibility screening analysis indicates that operation of the Dolores Alternate 2 compressor station could cause plume visibility impacts at Mesa Verde National Park.

Impacts to Topography

Cut-and-fill actions to establish a level ROW on steep side sloping (40 percent slope or greater) terrain would decrease the amount of natural slope contour on 11 acres for the long-term (greater than 50 years). Cut-and-fill on side slopes greater than 40 percent would be required only in the Ryman Creek drainage in Dolores County, Colorado (MP 194.3 to 194.6, and MP 196.8) where topographic constraints limit other route options. These slope alterations represent less than 1 percent of the construction ROW area. Active landslide areas crossed by the pipeline would be stabilized by environmental protection measures described in Chapter 2.

Conclusion. Natural slope contour would be changed on 11 acres in the Ryman Creek drainage in Dolores County, which represents less than 1 percent of the construction ROW area.

Impacts to Leasable Minerals

Construction of the pipeline would conflict with surface coal mining on one active Federal coal lease in San Juan County, New Mexico, approximately 2 miles south of the Colorado/New Mexico border at Milepost 272.8. The route would traverse 0.1 mile of the lease corner and would require an alternate pipeline realignment of 0.25 to 0.5 mile to the south to avoid this active lease. No potential conflicts with oil and gas development and active oil shale leases were identified.

Coal and oil shale resources underlying the ROW that are not under active lease, or near-term development represent a potential loss of leasable minerals due to pipeline operation. This loss would be dependent on mineral prices and available mining methods. Assuming that the pipeline would occupy an undevelopable strip 0.25 mile wide, construction of the pipeline could cause future conflicts with mining operations on 9.25 square miles of underlying oil shale yielding 25 gallons per ton, and on 1.5 square miles of underlying coal that could be surface-mined.

Conclusion. The proposed route would cross 0.1 mile of one active Federal coal lease in San Juan County, New Mexico, approximately 2 miles south of the Colorado/New Mexico border at Milepost 272.8. The proposed route would cross the lease corner, and would require an alternate pipeline realignment of 0.25 to 0.5 mile to the south to avoid this active lease. No potential conflicts with oil and gas development, and active oil shale leases were identified. Construction of the pipeline could cause future conflicts with mining operations on 1.5 square miles of underlying coal that could be surface-mined, and on 9.25 square miles of underlying oil shale potentially yielding 25 gallons per ton. Market forces could dictate the feasibility of moving the pipeline.

Impacts to Mineral Materials

No direct conflicts with active mineral materials (sand, gravel, clay) operations were identified. Future access to unleased Federal and undeveloped mineral materials may be precluded because existing surface uses would take precedence over mineral development for the long-term. Assuming a buffer strip of 200 feet, future access to privately owned mineral material development could occur on approximately 55 acres.

Conclusion. No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to an estimated 55 acres of unleased or privately owned mineral materials.

Impacts to Surface Water Quality

Trenching, pipe laying, and backfilling in flowing streams would Increase suspended sediment in these streams over the short term (1 to 5 days) required to install the pipe in the streambed. The quantity of suspended sediment that would be produced cannot be reliably estimated because of the variation in bottom substrate, channel morphology, and flow velocity among individual streams. Construction of the proposed route would require construction across 17 minor perennial streams requiring less than 1 day per crossing; 5 major streams requiring 1 to 3 days per crossing; and 5 major rivers that would require 3 to 5 days per crossing.

Streambed trenching at the Dolores and San Miguel River crossings could expose sediments potentially contaminated by mine wastes. Trenching would disturb an estimated 160 cubic yards of sediment in the Dolores River and 53 cubic yards of sediment in the San Miguel River for a short duration. Sampling the river sediments at the proposed crossings and developing appropriate construction mitigation methodologies to control the re-suspension of any mining-related contaminants (See Chapter 2, Environmental Protection Measures) would eliminate the risk of surface water contamination in these rivers.

Conclusion. Trenching, pipe laying, and backfilling in 5 major rivers, 5 major streams, and 17 minor perennial streams would increase suspended sediment for 1 to 5 days during the pipeline installation period.

Impacts to Municipal Watersheds and Water Supplies

Clearing, grading, and recontouring of 36 acres of ROW across the Palisade municipal watershed would increase soil erosion from the ROW over the short term (1 to 3 years), with a very low likelihood of increased suspended sediment increases in watershed streams (Rapid Creek and Cottonwood Creek). Trenching, backfilling, and surface compaction of the ROW would slightly decrease the permeability of watershed soils over the short term (1 to 3 years). The cleared ROW would be approximately 0.3 percent of the Palisade watershed, which represents a very small portion of the watershed recharge area. With the exception of Kruzen Springs, the pipeline would be greater than 0.5 mile from all spring clusters and intakes; the pipeline would cross 0.25 mile below Kruzen Springs, and would not intercept the water supply zone for these springs.

Trenching and backfilling across the Dolores River would slightly increase suspended sediment in the river, which would then pass into the Dolores municipal water treatment plant intake located 2.5 miles downstream. This suspended sediment increase would be short-term (2 to 5 days). Very small increases in sedimentation in the Farmers Ditch inlet to the Farmington water supply reservoir are expected because the ditch inlet from the river is a relatively large distance (8 miles) downstream from the pipeline crossing of the Animas River.

No impacts are anticipated to the Gurley Ditch, or Grand Junction aqueduct because these water supply canals would be bored to prevent interruption in service. The Mesa Verde National Park water lines would not be affected because the TransColorado pipeline would be installed under the existing line to avoid water supply pipeline damage, or service interruption.

Conclusion. Clearing, grading, trenching, and backfilling 36 acres of ROW within the Palisade municipal watershed would slightly increase soil erosion, and slightly decrease the permeability of the ROW soils over the short term (1 to 3 years). The pipeline would avoid all spring clusters and

intakes. Trenching across the Dolores River would slightly increase suspended sediment at the Dolores municipal water treatment plant intake for a period of 2 to 5 days.

Impacts to Bureau of Reclamation Water Projects

Construction across the inlet canal system of Jackson Gulch Reservoir in Montezuma County (MP237.3) and the proposed Animas-La Plata project would not interrupt existing or future irrigation water deliveries because TransColorado has committed to bore under lined canals and to trench through unlined canals when they are not in use.

Construction across these canals would not result in damage to the canals because TransColorado has committed to restoring them to their original condition and to monitoring for canal integrity for 2 years following construction.

Conclusion: Based on TransColorado's commitment to bore under lined canals, trench through unlined canals when they are not in use, restore the canals to their original condition, and to monitor for canal integrity for 2 years, the pipeline would not affect irrigation water deliveries or canal integrity.

Impacts to Wetlands

Disturbance of wetlands by pipeline construction activities (clearing, grading, and trenching) would result in short- and long-term alterations in wetland vegetation, soils, and water quality. Wetlands are primarily associated with the riparian zones of the major perennial streams and rivers throughout the region traversed by the pipeline. Appendix C, Tables C-1 and C-2 provide a list of the wetlands (riverine and palustrine) that would be crossed by the pipeline.

Little or no reduction of watershed or water quality maintenance functions is anticipated from construction because the limited acreage of riparian wetland disturbance is much less than 1 percent of the total wetland acreage in each of the five river drainage basins traversed by the project; and perpendicular crossings of wetlands are not expected to change the stream channel shape or drainage patterns. Therefore, long-term effects on wetland functions downstream of the crossing are not expected. Similarly, little or no reduction of the productive capacity of wetland soils is anticipated from pipeline construction.

Removal of vegetation from the construction ROW would result in both short- and long-term disturbance to wetlands. Recovery of wetland shrubs (willows, hawthorn, red-osier dogwood, rose) would vary by species. Removal of herbaceous species is expected to be short-term, with recovery to pre-existing cover within 1 to 3 years. Fast-growing species that can resprout from stumps (e.g., willows) could likely recover most of their former size within 5 years; however, because cattle and big game seasonally browse, these shrubs would take more than 5 years to recover.

Cutting of mature trees would reduce wetland function. Riparian woodlands provide important nesting and roosting habitat for many species of birds. Areas where large cottonwoods are present on or near the proposed route include the Colorado, San Miguel, Dolores, La Plata, and Animas Rivers. Mature trees on these larger floodplains have been or can be avoided by minor realignment. Other areas where losses of mature trees may occur are in the canyons of the West, Middle, and East Forks of the Mancos River and La Plata River, where riparian trees form a closely spaced line along a narrow floodplain bounded by steep side slopes.

Conclusion. Pipeline construction would decrease herbaceous vegetation cover on 13 acres of wet meadows/haylands for the short term; 2 acres of shrub wetlands for the long term, and decrease shrub and tree cover on 14 acres of forested wetlands for the long term. Much less than 1 percent of the wetlands in any watershed would be disturbed by pipeline construction.

Impacts to Soils

Construction would temporarily increase soil erosion from all disturbed soil surfaces with possible continued erosion from disturbed soils on difficult-to-revegetate areas.

Some increased erosion and soil loss would be expected from all disturbed areas along the ROW (approximately 2,802 acres) during the first year following construction, and until vegetation is fully

re-established. On areas of saline/alkaline soils (527 acres), steep (greater than 15 percent) slopes (336 acres), or shallow/rocky soils (1,090 acres) revegetation may be more difficult. Application of specific protection measures to which TransColorado has committed (Chapter 2) would reduce erosion rates to levels equivalent to those on adjacent, undisturbed areas within the first 1 to 5 years following construction, depending on field conditions. All disturbed areas would be revegetated with the seed mixes contained in Table D-1 except where landowners and land managing agencies specify other seeding requirements.

Soil protection measures would minimize or alleviate soil compaction and minimize the mixing of topsoil with subsoil materials during removal, storage, and reapplication.

Conclusion. Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 1 to 5 years. Some increased erosion would be expected on the entire 2,802 acres. On areas of saline/alkaline soils (527 acres), steep (greater than 15 percent) slopes (336 acres), or shallow/rocky soils (1,090 acres) revegetation may be more difficult. Over the long-term, wind and water erosion losses and vegetation productivity losses from the pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.

Impacts to Prime and Unique Farmlands

Pipeline construction would result in the disturbance of 82 acres of prime farmland and 109 acres of farmlands of statewide importance. Disturbance to farmlands would be short-term (two growing seasons). A fraction of 1 percent of farmlands within the counties crossed by the pipeline would be taken out of production for two growing seasons as a result of pipeline construction.

Conclusion. Pipeline construction would decrease production on 82 acres of prime farmland and 109 acres of farmlands of statewide importance. A fraction of 1 percent of the farmland in any county crossed by the pipeline would be taken out of production for two growing seasons.

Impacts to Forestry

Pipeline construction would result in the removal of 264 acres of timber resources (Douglas fir, Ponderosa pine, aspen) and removal of fuel wood and fencepost resources from 636 acres of pinyon-juniper woodlands.

Conclusion. Pipeline construction would remove conifer and aspen timber resources and pinyon-juniper fuel wood/fencepost resources from 900 acres. These would be long-term impacts of approximately 11 percent of the timber, fuel wood, and fencepost annual harvest from adjacent public lands (1990 harvest).

Impacts to Livestock Grazing

Clearing the ROW and compressor station sites would result in the loss of approximately 238 AUMs per year (2,026 acres). Less than 1 percent of the AUMs available in grazing allotments crossed by the pipeline would be lost. No reductions in stocking rates would occur in any allotments as a result of pipeline construction. Disturbance of rangelands would be short-term; on most sites forage production would return to pre-construction levels within 5 years. Forage production may take several years to return to pre-construction levels in areas of low precipitation and poor soils.

Conclusion. Pipeline construction would decrease AUMs by 238 but would not reduce stocking rates in any allotments crossed.

Impacts to Wildlife

Construction activities would temporarily displace big game animals away from construction areas and disturb habitat in the construction ROW. Big game animals (especially elk and deer) would likely decrease their use of habitats within 0.5 mile of construction activities (Lyon and Ward 1982; Reed 1981). This disturbance would be short-term. Following construction, animals would return to the area. Construction would occur during the spring-summer-fall periods when big game animals are generally not using key winter

ranges. Due to the transitory and linear nature of construction activities and the thousands of acres of surrounding spring-summer-fall range, big game animals would be able to move to adjacent areas.

Construction would remove most of the vegetation on 1,100 acres of key mule deer range, 1,027 acres of key elk range, and 18 acres of key antelope range. All big game winter ranges (especially these key ranges) are important to maintain big game herds. However, on a regional basis, these acreages of disturbance are a small percentage (less than 1 percent) of the adjacent key ranges and winter ranges available.

It is expected that cover of herbaceous species on most sites will be comparable to pre-existing cover within 5 years; species composition would be similar, or somewhat less than pre-disturbance conditions, depending on the revegetation mixture used and re-establishment of native species from seeds in re-applied topsoil. It is expected that trees (ponderosa pine and aspen) would require 40 to 60 years to reach equivalent size of most trees present in the pre-construction ROW; pinyon pine and Utah juniper could require 50 to 100 years to reach equivalent size. Taller shrubs, such as Gambel oak and serviceberry, would require 15 to 20 years to reach their former size, even if they were to regenerate from root sprouts. Smaller rangeland shrubs (e.g., big sagebrush, rubber rabbitbrush) might re-establish more rapidly (5 to 10 years); saltbush species would regenerate more slowly (15 to 20 years). For patch cutting in mule deer and elk habitat, generally, a maximum forest opening of 40 acres and a maximum opening width of 1,200 to 1,600 feet are recommended (McAninch et al. 1984). The proposed pipeline ROW would be 75 feet wide, and a 4-mile section would clear approximately 36 acres. This long and narrow pipeline disturbance is much less than big game habitat changes from timber operations in forested areas. Along 64 miles of key elk range and 76 miles of key mule deer ranges, the proposed pipeline parallels existing ROWs. With the added 75-foot TransColorado construction ROW, the total width of disturbance along these existing ROWs would range from 150 feet to 350 feet. Even with a combined 350-foot ROW, 1 mile of ROW would disturb approximately 42 acres.

Construction activities would temporarily displace small game animals from the construction ROW, disturb habitat in the construction ROW, and result in a limited loss of some nests or young. Displacement of small game animals away from construction would be a short-term impact. Some species with depressed populations would be able to relocate to adjacent habitats. Other species, with populations at or near the maximum carrying capacity, would suffer some increased population mortality, and loss of production during the construction year. The expected losses would not have a detectable effect on species populations. The pipeline would cross six sage grouse breeding/nesting areas, resulting in a long-term disturbance of 254 acres of sage grouse breeding/nesting habitat. A nesting area is defined as a lek site and surrounding 2-mile radius (approximately 8,042 acres). Six breeding/nesting areas would include approximately 48,252 acres. Thus, the total acreage disturbed by pipeline construction is very small (less than 1 percent of the breeding/nesting areas crossed). The proposed pipeline would pass through one lek site and pass within 200 to 300 feet of another lek site. Habitat disturbance in these areas could force breeding sage grouse off of traditional leks. Long-term population reductions could result for sage grouse associated with these two leks. Removal of sagebrush escape cover near these leks could cause long-term increase in predation of breeding sage grouse (Braun 1991).

Construction activities would decrease the numbers of small, less mobile, non-game animals in the construction ROW. Other construction impacts would include temporary displacement of animals away from construction activities and disturbance of habitat on the construction ROW. Adequate habitat exists adjacent to the construction ROW to support any displaced animals. Construction activities in grassland, sagebrush, and saltbush habitats would result in a short-term structural vegetation change. Construction would disturb 900 acres of forested habitats, 454 acres of mountain shrub habitats, and 9 acres of riparian habitats. Construction in these habitats would result in a long-term structural change in vegetation. Large shrubs and trees would take more than 5 years to revegetate in the ROW. The structural change would set back succession and make minor changes to the suitability of the habitat (in the 75-foot

construction ROW) for a variety of non-game species. Due to the narrow nature of the disturbance, very minor changes in species composition would occur. The 75-foot disturbance width would not fragment any habitats or prevent movement of species not adapted to disturbed habitats (Sedgwick and Ryder 1987).

Conclusion. Construction disturbance would decrease less than 1 percent of the surrounding key game ranges and vegetation types and would displace an unquantifiable number of animals. No regional population declines would result from pipeline construction for any species. A local population decline could occur for sage grouse utilizing the two leks that would be disturbed by construction activities.

Impacts to Fisheries

Construction activities would decrease aquatic organisms and fish populations, remove substrate, and increase sedimentation.

Of the 5 major rivers, 5 major streams, and 17 minor perennial streams crossed by the pipeline, 15 are categorized as Class I, cold water aquatic resources. The remaining are classified as Class 2, cold water or warm water aquatic resources. Reduction in fish population would result if important spawning or rearing habitats were covered by sediment or disturbed during construction. Construction impacts would be limited to areas immediately downstream from the pipeline crossings. Since the sedimentation increase would be temporary (several days to several weeks), no measurable effect would be expected on juvenile and adult fish. Fish may avoid the construction site due to increased sedimentation or noise. Since no critical spawning areas have been identified at the crossings, impacts to important fish species would be considered minor. These impacts would be short-term, generally less than 1 year or one reproductive cycle for fish and several months for other aquatic communities.

The removal of streamside vegetation and the resulting reduction in shading and potential for increased bank erosion would degrade aquatic habitat. Because of the small percentage of habitat on each stream that would be disturbed changes in fish populations are expected to be unmeasurable. No fisheries impacts would occur in the event of an instream release of natural gas. Methane, the primary pipeline product, is not toxic to aquatic life and would disperse into the atmosphere.

Conclusion. Pipeline construction would result in short-term increases in sedimentation and short-term losses of streambed substrate and biota in 15 Class I cold water rivers and streams and 12 Class II rivers and streams. The streambed disturbance would result in very limited fish mortality and no loss of fishery quality or recreational opportunities.

Impacts to Threatened and Endangered Species

Compliance with environmental protection measures included in Chapter 2 would ensure protection of threatened and endangered species. The sole exception, apparent at this time, would be disturbance of these species during crucial periods from emergency pipeline maintenance activities. Species most sensitive to this would be wintering and nesting bald eagles, nesting spotted owls, and the Colorado River fishes. Effects would Include nest and roost abandonment, loss of production, or mortality. Incidents requiring this type of emergency maintenance occur so infrequently that the impact is not likely to jeopardize the continued existence of a species or cause the listing of others. (See the Public Safety section in Chapter 4 for further information on pipeline precedent incidents.)

Conclusion. Compliance with environmental protection measures included in Chapter 2 would ensure protection of threatened and endangered species. There is a very low likelihood that emergency response actions would disturb threatened and endangered species during crucial periods.

Impacts to Cultural Resources

Surveys conducted prior to construction would evaluate presently known and newly discovered archaeological sites. Testing and/or mitigating these sites according to the Programmatic Agreement (Appendix F) would increase data recovery of eligible National Register of Historic Places (NRHP) cultural resource sites where

avoidance is impossible. Sites that have not been assessed for eligibility to the NRHP must be treated as if they are eligible until assessment of their status is made. Compliance with specified road closures by the land management agencies and the worker education program would greatly reduce, but not entirely eliminate unauthorized collection of artifacts by construction personnel or the public, or accidental site disturbance.

Conclusion. The required Class III surveys and TransColorado's Programmatic Site Agreement would protect cultural resources and provide for mitigation where sites must be disturbed. Data recovery as a result of pipeline construction could be considered as a beneficial impact because of an increase in the scientific data base. However, removal of any scientific data is considered disturbance and, thus, requires a long-term decrease in intact cultural sites.

Impacts to Native American Religious Values

Pipeline construction disturbance could reduce the value of Native American traditional use or religious areas that may be present on or near the ROW.

Conclusion. Specific information on Native American traditional use and/or sacred sites on or near the route has not been received. Native American groups commonly do not wish to disclose the locations of these sites to the public. The BLM's archaeologist will continue coordination efforts with the affected tribes to identify these sites to assure their protection. Any site-specific information provided by tribal members will remain confidential. Any disturbances to traditional cultural properties of Native Americans or indirect impacts due to unauthorized collection of surface artifacts would decrease the value or significance of the sites.

Impacts to Visual Resources

The pipeline would cause varying decreases in visual resource values over the length of the ROW and at aboveground facilities. At most locations, adverse visual effects can be measurably reduced by limiting ground disturbance; limiting visibility by maintaining vegetative screening; and repeating the naturally occurring forms, lines, colors, and textures of the surrounding landscape, particularly in vegetative treatments and the colors of aboveground facilities. At several locations (Figure 4-1, end of chapter), however, visual impacts are expected to remain high. ROW clearing in areas with trees and/or oak brush would have a long-term impact on the dispersed recreation experiences of hikers, hunters, and other recreation users.

Results of the impact analysis are shown on Figure 4-1. Miles of high and moderate visual impacts are summarized in Tables 2-19.

The terrain disturbance resulting from pipeline construction could not be fully mitigated to retain the existing quality identified for the levels crossed by the pipeline and compressor stations sites following:

Compressor Stations

1. Questar-Piceance Compressor Station (MP 0). The compressor station would create high contrasts with the existing undeveloped rural landscape. The site would be visible by viewers traveling along the valley floor on the county road. This area is in a VRM Class II area.

2. WestGas-DeBeque Compressor Station (MP 48). This site would create a high physical contrast with the surrounding agricultural landscape and would be visible from rural residences and viewers traveling local roadways and I-70.

3. TransColorado-Olathe Compressor Station (MP 121). This compressor station would be observed by viewers on Transfer Road. The site would create a high physical contrast with the surrounding undeveloped rural landscape consisting of native woodland and shrubland vegetation communities.

4. The Dolores Compressor Station (MP 208). This station, if constructed, would be visible from two county roads. The site would create high contrast with the surrounding undeveloped and partially forested landscape.

Pipeline Crossing

1. The bluff between Alkali Creek and the Gunnison River (MP 104.6 - MP 105). This crossing is located in a badlands-type landscape. Pipeline scars would be visible from the highly travelled U.S. Highway 50 and would create moderate physical contrasts with the surrounding landscape.

2. Roubideau Creek (MP 110 to MP 111). This crossing would create high visual contrasts as the pipeline crosses the deep narrow creek drainage. Pipeline scars would be visible from area rural residences.

3. San Miguel River (MP 151.1 to MP 151.6). The crossing of this river would create high visual contrast on steep canyon walls. The ROW would be visible from State Highway 145 and FS/BLM access roads.

4. Parallel to the La Plata River and Highway 140 (MP 266.5 to MP 267.5). This crossing would create high visual contrast with the surrounding La Plata River Valley and agricultural and riparian landscapes. The contrasts would be visible from State Highway 140 and from several rural residences.

Conclusion. The Proposed Action would result in approximately 4.3 miles of high, short- and long-term visual resource decreases along the ROW and at four aboveground facility sites. These impacts would exceed the visual management objectives for these areas.

Impacts to Transportation System

Construction would result in the improvement of 199 miles of dirt and gravel roads, primarily on Public and National Forest lands. Construction would also cause short-term traffic delays at crossings of county, BLM, and USFS roads. Construction-related traffic would also contribute to temporary congestion and possible delays near each construction site.

Conclusion. Construction would result in possible short-term traffic delays during road crossings and would require improvement or grading of 199 miles of dirt/gravel roads.

Impacts to Solid Waste Facilities

Pipeline construction would increase contributions to solid waste landfills. Pipeline construction activities would generate solid wastes, such as ordinary trash, packaging materials, and other construction waste, at an estimated rate of 20 cubic yards per day for each of three construction spreads for an estimated total of 4,300 cubic yards during the construction period. This solid waste would be placed in some or all of 16 identified licensed landfills in the counties crossed by the proposed route. This would represent only a minor incremental addition of solid wastes to these facilities and would be of a short duration during the construction period.

Conclusion. An estimated 4,300 cubic yards of construction-related solid waste would be generated by the Proposed Action and placed in licensed landfills along the pipeline route.

Impacts to Socioeconomic Conditions

Construction

Communities and Residences

Because of the short duration of the construction period, it is assumed that 15 percent of the non-local work force would bring their families. Based on the 1979 Pipeline Construction Workers and Community Impact Survey Reports, 0.3 dependents per non-local worker are expected (Mountain West Inc. 1979). This would result in an average of 324 dependents arriving in the region. Total non-local workers and dependents per construction spread would increase local populations by less than 5 percent based on the assumption that one construction spread would be based in Grand Junction, one in Montrose, and one equally divided among Cortez, Durango, and Farmington. With this limited influx of people to the area, the project would increase short-term demands for local services such as police, fire, medical services, and schools.

The presence of an increased labor force during construction would increase demands for housing in some localities. It is assumed that 26 percent of non-local workers would occupy rental units,

42 percent would occupy motel/hotel units, and 28 percent would choose to stay at RV sites (ENSR 1991). Rental and RV sites are minimal and almost nonexistent in Durango during the school year (Kennedy 1990).

The project would employ an average of 1,440 persons, of which 25 percent would be local. Approximately $5.8 million would be spent on local goods and services during pipeline construction.

Occupants of 42 residences that have been identified within 500 feet of the pipeline ROW would experience short-term increases in construction noise and dust during daylight hours for a period of 2 to 3 weeks. Typical noise levels from a rural/suburban pipeline construction scenario were estimated at 70 dBA approximately 300 feet from the site and 60 dBA approximately 1,200 feet from pipeline construction (Angeles Pipeline 1987).

Operation

Taxes and Fees

Operation of the pipeline would increase the property tax base by approximately 5 percent or less in all counties crossed by the pipeline except for Dolores County, which could experience a 20 percent increase. This estimate is based on project-related tax receipts for the first year of operations (1993) of $4.2 million in 1991 dollars (including pipeline and seven compressor stations) and an estimated total cost of the pipeline at $136.1 million, or approximately $450,662 per mile. Property taxes would be assessed and collected by the individual counties and school districts along the route.

Employment of approximately 20 persons for the operation activities would contribute approximately $18,240 monthly ($218,880 annually) to sales of local goods and services. This estimate is based on an estimated monthly payroll of $60,800.

Based on a 1991 fee schedule, an annual right-of-way fee of approximately $10,000 would be paid by the applicant to both the BLM and USFS for use of the ROW granted on public lands. The per acre rate for this fee is set annually by the Federal government and varies by county.

Natural Resources and Crop Production

Removal of timber, fuel wood, and livestock forage from the construction ROW would decrease the availability of these resources, which can be expressed in dollar values. Harvest value of commercial species (ponderosa pine, Douglas fir, aspen) from the construction ROW is estimated to be $9,600; harvest value of pinyon and juniper fuel wood is estimated to be $47,700. These harvest values would represent the entire expected life-of-project loss because of the slow regeneration rates of forest trees, and because TransColorado would allow timber regeneration on the construction and operational ROW. Loss of forage from the construction ROW over a 5-year period (estimated to be the forage recovery period) is estimated to be approximately $3,000. When these values are converted to an annual basis (harvest value is divided by a 50-year project life), these natural resource values represent 11 percent of the annual ROW fee charged to TransColorado by Federal agencies.

Pipeline installation along the construction ROW would decrease production of annual and perennial (hayland) crops during the year of construction. Based on a Colorado statewide 1990 market value of $82 per acre of hay crops (Sakry 1991) expected crop values lost for two years on 273 acres of agricultural lands would be $44,800. This production loss would be much less than 1 percent of the annual agricultural production value in the counties crossed by the pipeline.

Private Lands

Because the noise levels used to predict the impact of the compressor stations on nearby noise-sensitive areas (NSAs) are based on unspecified engine units and the details of noise control treatment for each compressor station has not been provided at this time, the noise impacts listed in Table 4-2 are estimates. However, the stations will be designed to limit the noise attributable to the operation of the compressors to 55 dBA, which is the sound level that would protect the public from interference and annoyance.

Operation of the pipeline would increase the private land area committed to long-term utility ROW uses by 787 acres. These commitments

TABLE 4-2

TransColorado Gas Transmission Project
Compressor Station Noise Impacts at Nearest Sensitive Receptors
Proposed Action

Compressor Station	Location	Total HP	Receptor 1[1] Range (feet)	Receptor 1[1] Noise Level (dBA)[3]	Receptor 2[1] Range (feet)	Receptor 2[1] Noise Level (dBA)[3]	Receptor 3[1] Range (feet)	Receptor 3[1] Noise Level (dBA)[3]
Quester-Piceance[2]	Rio Blanco County	12,390	N/A	N/A	N/A	N/A	N/A	N/A
WestGas-Meeker	Rio Blanco County	2,700	1,800	49.8	2,600	46.7	3,400	44.3
Rocky Mountain-DeBeque	Garfield County	2,400	4,700	41.5	4,800	41.3	---	---
WestGas-DeBeque	Mesa County	2,700	1,900	49.4	2,800	46.0	3,300	44.6
TransColorado-Olathe[2]	Montrose County	4,750	N/A	N/A	N/A	N/A	N/A	N/A
Rocky Mountain-Big Gypsum[2]	San Miguel County	600	N/A	N/A	N/A	N/A	N/A	N/A
Dolores Alternate 1	Dolores County	5,400	1,050	54.5	4,410	42.1	4,440	42.0
Dolores Alternate 2 (north site)	Montezuma County	5,400	315	65.0	840	56.5	1,194	53.4
Dolores Alternate 2 (south site)	Montezuma County	5,400	984	55.1	1,260	52.9	1,395	52.1

[1]Receptors are numbered by proximity to the compressor station.

[2]There were no known sensitive receptors identified within 1-mile radius of the Piceance, Olathe, Big Gypsum, and Big Gypsum Alternate sites.

[3]Day-night average sound levels (L_{dn}). Estimates based on manufacturer's data for a 6,200 hp unit with an Leg of 55 dBA at 300 feet.

would not preclude the use of the ROW for existing annual and perennial crop use. Construction of permanent structures would not be allowed on the permanent ROW, which would limit future land uses for this purpose. The combination of the TransColorado ROW with existing parallel ROWs would preclude future building construction on an average of 12 percent of the area of 15 small land parcels (less than 20 acres). Preclusion of future development on land parcels larger than 20 acres would be much less on a percentage basis.

During the scoping process, local residents expressed concern that the presence of the pipeline and associated constraints on development within the ROW would have a negative impact on land values and property resale value. Based on discussions with several appraisers (Metcalf 1991; Goodman 1991; Johnson 1991; Kenton 1991), it was concluded that presence of the pipeline would generally not impact the property valuation unless the ROW presence rendered the entire property "economically or functionally obsolete" (unbuildable). Local county appraisers indicated that pipelines are generally not considered when appraising land for tax purposes.

Natural Gas Markets and Pipeline Capacity

Operation of the Proposed Action, regardless of route selection, would result in the transport of gas originating from outside the San Juan Basin into this natural gas production region. Recent concerns that available take-out capacity -- primarily on El Paso and proposed TransWestern lines to California -- would be limited, if not constrained, have prompted the Southern Utes to claim economic damage from the TransColorado Project. The Southern Utes claim that if the TransColorado pipeline becomes operational, the Utes would lose approximately $1.3 million in royalty revenues in 1993 due to the additional capacity constraint caused by TransColorado's movement of gas produced north of the San Juan Basin (Cook 1991).

TransColorado has also prepared a report (TransColorado 1991) concerning the capacity situation in the San Juan Basin. The Southern Ute and TransColorado reports differ in their projections of predicted natural gas production in the San Juan Basin. The Utes estimate that in 1993 total gas production (conventional and coal seam) in the region would be 3.68 billion cubic feet per day (Bcfd), whereas TransColorado claims these supplies would not likely exceed 2.4 Bcfd. Both reports estimate pipeline take-away at the Blanco metering station to be between 3.2 and 3.6 Bcfd. These take-away capacity estimates include expansion proposals by El Paso Natural Gas and Transwestern.

The Southern Ute perspective is that if pipeline capacity downstream of the Blanco plant is compared with the San Juan Basin predicted gas supply, there is currently a pipeline shortfall of 0.619 Bcfd, and if TransColorado were included, this shortfall would be increased to 0.919 Bcfd. According to the New Mexico Oil and Gas Commission (Bush 1991), conventional gas production for the entire San Juan Basin would be around 1.1 to 1.2 Bcfd in 1993. The New Mexico Oil and Gas Commission believes that the Southern Ute's forecast of 1.88 Bcfd for conventional gas production is an optimistic figure. The 1.88 Bcfd production could be achieved if all 1,600 well permits currently in existence were completed, and each well would produce at least 1 MMcfd with some producing slightly more. According to the New Mexico Oil and Gas Commission, 1,158 wells have been completed out of a total of 1,600 permits issued. TransColorado's figures for 1993 are 1.15 Bcfd for coal seam gas and approximately 1.3 Bcfd of conventional gas.

Market fluctuations combined with royalty and tax structures have influenced the opportunities to market Southern Ute natural gas. During economic upswings, market prices can increase to as high as $2 to $4 per Mcf of gas. With royalties charged by the tribe on the market value of gas produced at a rate of 12.5 to 25 percent, royalties received for the higher priced gas are much more than those received at the current market value of $1 per Mcf. In addition to royalties, producers on tribal land must pay a severance tax (Tribal Ordinance 89-01) of 6.5 percent on the market value of the gas taken from the reservation as well as the severance tax imposed by the state (5 percent in Colorado).

It is clear from the disparity in predictions that forecasting is, at best, dependent on a given set of assumptions. It is quite possible that the Southern Utes would experience a more

competitive market as a result of the inclusion of TransColorado's gas stream into the region; however, it is very difficult to quantify the impacts of increased competition independent of uncertainties such as market performance, royalty and tax levels, and future expansion projects. It should be noted, if the direction of flow in the TransColorado pipeline were reversed in order to transport gas to the midwestern markets, the take-away capacity available to the San Juan basin would be increased. This may result in a beneficial impact on the Southern Utes.

Conclusion. Occupants of 42 residences would be exposed to short-term (2 to 3 weeks) increase in pipeline construction spread-related noise and fugitive dust. Crop production would be precluded on 273 acres for 2 years. Construction activities will result in employment of approximately 360 local workers and local expenditures of $5.8 million by local and non-local workers. Rental housing, motel/hotel, and RV accommodations for the construction labor force might not be adequate during the summer.

Operation of the pipeline would yield approximately $4.2 million in first year property taxes, and $10,000 in ROW fees would be paid to Federal agencies for the first year. Based on current valuations, the annualized value of timber, fuel wood, and livestock forage removed from the ROW would represent approximately 11 percent of the annual Federal ROW fees. The value of crop production precluded on 273 acres for 2 years is estimated to be $44,800. Approximately 20 persons would be employed as operational staff. Payroll for this staff would result in local expenditures of approximately $219,000 annually for goods and services. Operation of the pipeline would increase the private land area committed to long-term utility uses by 787 acres. The combination of the TransColorado ROW with existing parallel ROWs would preclude installation of buildings on an average of 12 percent of the area of 15 land parcels less than 20 acres.

The Southern Utes would likely experience increased competition for sales of tribal natural gas if the TransColorado Pipeline were built. However, the extent to which this increased competition would affect sales is difficult to quantify because of uncertainties in estimating available gas supplies, future market prices, and future changes in pipeline capacity.

Impacts to Public Safety

The transportation of natural gas by pipeline involves some degree of risk to the public in the event of an accident and subsequent release of natural gas. The greatest hazard is the possibility of fire or explosion following a major pipeline rupture. In the event of fire because of a natural gas leak or rupture, the pipeline company would be responsible for shutting off the supply of natural gas to the leaking section of pipeline. Once the leaking pipeline section is isolated, the leak or fire would be allowed to empty or burn itself out. Local fire departments would be responsible only for controlling the spread of secondary fires to any dwellings, structures, and property in the general area at risk.

In the event of a pipeline leak or rupture, an unquantifiable amount of pressurized natural gas (methane) would be released from the pipeline. Methane dispenses readily in air, and is not likely to cause an asphyxiation hazard to any nearby people. Methane is highly flammable. If released gas is ignited, the released gas will continue to burn until the pipeline is shut down. TransColorado anticipates that the response time to manually block valves would be approximately 0.5 hour during working hours and 1.0 hour during off-hours. As a consequence, a pipeline natural gas fire would likely burn 1 to several hours prior to control. The potential for a fire to spread would depend upon the combustible fuels nearby and the time of year.

Beginning in February 1970, 49 CFR Part 191 required all operators of transmission and gathering systems to notify DOT of specific types of incidents that occurred during operation of the approximately 300,000 miles of natural gas transmission and gathering systems nationwide. The number of failures during the 14-year period, from February 1970 through June 1984, remained fairly constant, with no upward or downward trends. Slightly more than half of the operational failures were caused by outside forces, defined as the encroachment of mechanical equipment, such as bulldozers and backhoes; from earth movements, such as washouts or geologic hazards; from weather effects, such as winds, storms, and thermal strains; and from willful damage. An analysis of the outside forces causing pipeline failures indicates that human

error in equipment usage accounts for approximately 75 percent of all such incidents.

The frequency of failure during operation is strongly dependent on pipeline age, with pipelines installed prior to 1950 exhibiting a significantly higher incidence of failure. Older pipelines have a higher frequency of corrosion, since corrosion is a time-dependent process, and new pipe generally has more advanced coatings and cathodic protection to reduce corrosion potential. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the rate of failure over unprotected or partially protected pipe. Older pipelines also have a higher frequency of incidents caused by outside forces, in part because they may be less well marked and, in part, because older pipelines tend to be of a smaller diameter and are more easily crushed or broken by mechanical equipment or earth movement.

The average number of non-employees killed in gas transmission and gathering line accidents per year is 2.5 (based on 1970-1984 data). This translates to a public fatality rate of 0.008 per 1,000 miles of transmission and gathering lines per year for the entire national network. Application of the industry-wide average to the total of 302 miles of pipeline for the proposed route yields a recurrence interval of one fatality every 410 years. The proposed pipeline expansion would cause only a slight increase in risk to the nearby public.

TransColorado has prepared an emergency response plan that will be followed in the event of spills or leaks.

Conclusion. Operation of the pipeline would result in an estimated fatality rate of 1 death for every 410 years of operation, based on the incident rates reported for the entire U.S. for the 1970-1984 period.

AGENCY PREFERRED ALTERNATIVE

Impacts associated with the Agency Preferred Alternative are discussed in terms of any differences to the Proposed Action. Specific impacts for each resource discipline are described below.

Impacts to Air Quality

Construction

Construction impacts to air quality would be the same as those described under the Proposed Action except for a minor decrease in construction emissions. Since the length of the route would decrease by 12 miles, a 4 percent proportional reduction in fugitive dust and equipment emissions would be expected.

Operation

Operational impacts to air quality would be the same as those described under the Proposed Action except the Rocky Mountain-Maverick compressor station (which would be substituted for the Proposed Action Rocky Mountain-DeBeque compressor station) would have greater maximum predicted concentrations (Tables 4-1 and 4-3) and the potential Dolores station would increase air quality impacts at Mesa Verde National Park. The total number of compressor stations would remain at seven, but the substitution of the Rocky Mountain-Maverick for Rocky Mountain-Big Gypsum site would result in approximately a 30 percent increase in maximum predicted carbon monoxide and nitrogen dioxide concentrations at that compressor location due to higher horsepower requirements (Tables 2-6 and 2-15, Chapter 2) at the Rocky Mountain-Maverick site. Although these pollutants would increase, the expected concentrations would be well below applicable air quality standards.

Locating the Dolores Station along the preferred pipeline corridor would increase air quality impacts at Mesa Verde National Park. Annual NO_2 concentrations would be 2.13 micrograms/cubic meter below the annual PSD Class I Increment of 2.5 micrograms/cubic meter. Based on this concentration, annual nitrate deposition was calculated to be 0.3 kg/hectare-year. Although the biological effects due to this level of deposition are unknown, this rate represents 6 percent of the background nitrate deposition rate of approximately 5 kg/hectare-year.

TABLE 4-3

TransColorado Gas Transmission Project
Air Quality Impacts at Agency Preferred Alternative Compressor Station Sites ($\mu g/m^3$)

Compressor Station	Pollutant	Averaging Time	Ambient Air Quality Standard ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$)
Quester-Piceance[1]	NO_2	Annual	100	34.5
	CO	1-hour	40,000	31.0
		8-hour	10,000	21.7
WestGas-Meeker[1]	NO_2	Annual	100	18.3
	CO	1-hour	40,000	266.5
		8-hour	10,000	186.5
Rocky Mountain-DeBeque[1,3]	NO_2	Annual	100	44.0
	CO	1-hour	40,000	56.0
		8-hour	10,000	39.2
WestGas-DeBeque[1]	NO_2	Annual	100	8.8
	CO	1-hour	40,000	141.9
		8-hour	10,000	99.3
TransColorado-Olathe[1]	NO_2	Annual	100	2.11
	CO	1-hour	40,000	1.54
		8-hour	10,000	1.07
Rocky Mountain-Maverick[2]	NO_2	Annual	100	7.0
	CO	1-hour	40,000	8.9
		8-hour	10,000	6.2
Dolores[2]	NO_2	Annual	100	5.60
	CO	1-hour	40,000	69.97
		8-hour	10,000	48.98
Dolores Alternate 1[2]	NO_2	Annual	100	5.60
	CO	1-hour	40,000	69.97
		8-hour	10,000	48.98
Dolores Alternate 2[2]	NO_2	Annual	100	5.60
	CO	1-hour	40,000	69.97
		8-hour	10,000	48.98

[1] COMPLEX I

[2] SCREEN

[3] Rocky Mountain-DeBeque is an existing compressor station. The maximum predicted concentrations due to increases in emissions from proposed modifications at this site are one half of the maximum predicted concentrations indicated in the table.

An analysis of plume visibility impacts at the Mesa Verde National Park boundary was conducted using an EPA Level 1 screening model (VISCREEN) that provides an initial estimate of plume effects on a PSD Class 1 area such as Mesa Verde National Park. Results of this analysis indicate that the Dolores and Dolores Alternate 2 compressor stations, which are the nearest pipeline route compressors to Mesa Verde National Park, failed the screening assessment. This finding indicates that the compressor station plume could be visible to viewers within the Park. The Dolores Alternate 1 station passed the screening assessment, and consequently would not be expected to generate a visible plume within the park.

Several uncommitted mitigation measures are available to reduce or eliminate the potential visibility impacts to Mesa Verde National Park from the operation of the Dolores and Dolores Alternate 2 compressor station. These measures are described in the Uncommitted Mitigation section of this chapter. If it is found that after application of technically achievable mitigation measures the Dolores or Dolores Alternate 2 compressor stations would not meet National Park Service and State of Colorado visibility requirements, these sites would not be approved by the Department of Interior for construction. In this event, Dolores Alternate 1 site or another site would have to be used.

Conclusion. Fuel combustion by pipeline construction equipment would increase the emissions of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 207 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of seven compressor sites. The daily fuel combustion emissions per mile from these activities are estimated to be equivalent to those emitted from a typical major urban street.

Operation of seven compressor stations would increase the local (within 1 mile) concentrations of nitrogen dioxide and carbon monoxide. These increases would range from 2.3 times the annual average background levels for carbon monoxide to 11 times the annual average background levels for nitrogen dioxide. No national air quality standards would be exceeded. Based on first-order, conservative screening analyses, the Questar-Piceance and Rocky Mountain-DeBeque stations show a potential exceedance of the PSD Class II NO_2 increment. Additional detailed, and more realistic modeling should lower potential impacts. A plume visibility screening analysis indicates that operation of the Dolores or the Dolores Alternate 2 compressor stations could cause plume visibility impacts at Mesa Verde National Park.

Impacts to Topography

Implementation of this alternative would reduce long-term changes to natural slope contours by 11 acres compared to the Proposed Action.

Conclusion. Natural slope contours would be changed on 0 acres.

Impacts to Leasable Minerals

Impacts to leasable minerals would be the same as those described under the Proposed Action, except that the Agency Preferred Alternative could conflict with development of 0.75 square miles more of strippable coal reserves.

Conclusion. The Agency Preferred Alternative would cross 0.1 mile of one active Federal coal lease in San Juan County, New Mexico, approximately 2 miles south of the Colorado/New Mexico border at MP 272.8. The proposed route would cross the lease corner, and would require an alternate pipeline realignment of 0.25 to 0.5 mile to the south to avoid this active lease. No potential conflicts with oil and gas development, and active oil shale leases were identified. Construction of the pipeline could cause future conflicts with mining operations on 2.25 square miles of underlying coal that could be surface-mined, and on 9.25 square miles of underlying oil shale potentially yielding 25 gallons per ton.

Impacts to Mineral Materials

Impacts to Mineral Materials are the same as those described under the Proposed Action.

Conclusion. No direct pipeline ROW conflicts with active mineral materials operations were

identified. There is some likelihood of future access preclusion to an estimated 55 acres of unleased or privately owned mineral materials.

Impacts to Surface Water Quality

Impacts to surface water quality would be the same as those described under the Proposed Action except that one less major stream would be crossed by this alternative.

Conclusion. Trenching, pipe laying, and backfilling in 5 major rivers, 4 major streams, and 17 minor perennial streams would increase suspended sediment for 1 to 5 days during the pipeline installation period.

Impacts to Municipal Watersheds and Water Supplies

Impacts to municipal watersheds would be the same as those described under the Proposed Action.

Conclusion. Clearing, grading, trenching, and backfilling 36 acres of ROW within the Palisade municipal watershed would slightly increase soil erosion, and slightly decrease the permeability of ROW soils over the short term (1 to 3 years). The pipeline would avoid all spring clusters and intakes. Trenching across the Dolores River would slightly increase suspended sediment at the Dolores municipal water treatment plant intake for a period of 2 to 5 days.

Impacts to Bureau of Reclamation Water Projects

Impacts to Bureau of Reclamation Water Projects would be the same as those described for the proposed route.

Conclusion: Based on applicant commitments, no interruption in use of irrigation canals, or damage from construction to existing irrigation canals owned or administered by the Bureau of Reclamation are expected.

Impacts to Wetlands

Impacts to wetlands would be the same as those described under the Proposed Action except for changes in disturbance to shrub wetland vegetation. This alternative would result in 1 less disturbed acre of shrub wetlands.

Conclusion. Pipeline construction would decrease herbaceous vegetation cover on 13 acres of wet meadows/haylands for the short-term; decrease shrub species cover on 1 acre of shrub wetlands for the long term, and decrease shrub and tree cover on 14 acres of forested wetlands for the long term. Much less than 1 percent of the wetland in any watershed would be disturbed by pipeline construction.

Impacts to Soils

Impacts to soils would be the same as those described under the Proposed Action except the total disturbance would decrease by 109 acres, areas of saline/alkaline soils would decrease by 145 acres, steep ascent/descent slopes (15 percent or greater) would decrease by 54 acres, and shallow/rocky soils would increase by 110 acres.

Conclusion. Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 1 to 5 years. Some increased erosion would be expected on the entire 2,693 acres. On areas of saline/alkaline soils (382 acres), steep (greater than 15 percent) slopes (282 acres), or shallow/rocky soils (1,200 acres), revegetation may be more difficult. Over the long-term, wind and water erosion losses would not be expected to exceed those presently occurring on adjacent, undisturbed soils.

Impacts to Prime and Unique Farmlands

Impacts would be the same as those described under the Proposed Action except that prime farmland disturbance would increase by 18 acres, and 27 more acres of farmland of statewide importance would be disturbed.

Conclusion. Pipeline construction would decrease production on 100 acres of prime farmland and 136 acres of farmland of statewide importance. A fraction of 1 percent of the farmlands in any county crossed by the pipeline would be taken out of production for one growing season.

Impacts to Forestry

Impacts would be the same as those described under the Proposed Action except 109 fewer acres of timber lands would be disturbed and 22 more acres of pinyon-juniper woodlands would be disturbed. These would be long-term impacts.

Conclusion. Pipeline construction would remove conifer and aspen timber resources and pinyon-juniper fuel wood/fencepost resources from 812 acres. These would be long-term impacts of approximately 10 percent of the annual timber, firewood, and fencepost harvest from adjacent public lands (1990 harvest).

Impacts to Livestock Grazing

Impacts would be the same as those described under the Proposed Action except that 12 fewer AUMs would be reduced over the short term.

Conclusion. Pipeline construction would decrease AUMs by 226 but would not reduce stocking rates in any allotments crossed.

Impacts to Wildlife

Impacts would be same as those described under the Proposed Action except that 227 fewer acres of key deer range, 291 fewer acres of key elk range, and 36 fewer acres of sage grouse breeding/nesting habitat would be disturbed. The preferred route would parallel 2 fewer miles of existing corridors through key elk range and 11 fewer miles of existing corridors through key mule deer range than the proposed route.

Conclusion. Construction disturbance would decrease less than 1 percent of the surrounding key game ranges and vegetation types and would displace an unquantifiable number of animals. No regional population declines would result from pipeline construction for any species. A local population decline could occur for sage grouse utilizing the two leks that would be disturbed by construction activities.

Impacts to Fisheries

Impacts would be the same as those described under the Proposed Action except that 1 less major Class I cold water aquatic resource stream would be crossed.

Conclusion. Pipeline construction would result in short-term increases in sedimentation and short-term losses of streambed substrate and biota in 12 Class I cold water rivers and streams and 14 Class II rivers and streams. The streambed disturbance would result in very limited fish mortality and no loss of fishery quality or recreational opportunities.

Impacts to Threatened and Endangered Species

Compliance with environmental protection measures included in Chapter 2 would ensure protection of threatened and endangered species. The sole exception, apparent at this time, would be disturbance of these species during crucial periods from emergency pipeline maintenance activities. Species most sensitive to this would be wintering and nesting bald eagles, nesting spotted owls, and the Colorado River fishes. Effects would include nest and roost abandonment, loss of production, or mortality. Incidents requiring this type of emergency maintenance occur so infrequently that the impact is not likely to jeopardize the continued existence of a species or cause the listing of others. (See the Public Safety section in Chapter 4 for further information on pipeline precedent incidents.)

Conclusion. Compliance with environmental protection measures included in Chapter 2 would ensure protection of threatened and endangered species. There is a very low likelihood that emergency response actions would disturb threatened and endangered species during crucial periods.

Impacts to Cultural Resources

Impacts to cultural resources would be the same as those discussed under the Proposed Action.

Conclusion. The required Class III surveys and TransColorado's Programmatic Site Agreement would protect cultural resources and provide for mitigation where sites must be disturbed. Data recovery as a result of pipeline construction could be considered as a beneficial impact because of an increase in the scientific data base. However, removal of any scientific data would be considered disturbance and, thus, would result in a long-term decrease in intact cultural sites.

Impacts to Native American Religious Values

Pipeline construction disturbance could reduce the value of Native American traditional use or religious areas that may be present on or near the ROW.

Conclusion. Specific information on Native American traditional use and/or sacred sites on or near the route has not been received. Native American groups commonly do not wish to disclose the locations of these sites to the public. The BLM and archaeologists will continue to coordinate efforts with the affected tribes to identify these sites to assure their protection. Any site-specific information provided by tribal members will remain confidential. Any disturbances to traditional properties of Native Americans or indirect impacts due to unauthorized collection of surface artifacts would decrease the value or significance of the sites.

Impacts to Visual Resources

Impacts would be the same as those described under the Proposed Action. Visual quality would be reduced at the following additional locations:

Compressor Stations

1. Dolores Compressor Station (MP 214.8). This compressor station site south of the town of Dolores would create high physical contrast with the surrounding undeveloped rural landscape and would be visible from residences and State Highway 184.

Pipeline Crossings

1. Mancos Valley (MP 223.2 to MP 226.8). Pipeline crossing in the Upper Mancos Valley would require removal of woodland vegetation creating high contrasts with the existing landscape and linear corridor effect from the ROW clearing. This ROW would be visible from rural residences, State Highway 184, and several county roads.

2. Mancos Valley (MP 227 to MP 227.6). Construction of the pipeline in this area will create open spaces from woodland clearing similar to that described above. The pipeline ROW would be visible from numerous residences, the town of Mancos, State Highway 160 (scenic byway), State Highway 184, and several county roads.

3. Parallel to Highway 160 (MP 229 to MP 231.4). The pipeline in this area would require some clearing of woodlands creating a linear Row contrasting with the existing undeveloped landscape. This portion of the pipeline would be visible from State Highway 160 (scenic byway) and rural residences.

Conclusion. The Agency Preferred Alternative would result in approximately 10.4 miles of high, short- and long-term visual resource decreases along the ROW and at four aboveground facility sites. These impacts would exceed the visual management objectives for these areas.

Impacts to Transportation

Impacts would be the same as those described under the Proposed Action except 34 fewer miles of ROW access roads would be improved.

Conclusion. Construction would result in possible short-term traffic delays during road crossings and would require the improvement or grading of 165 miles of dirt/gravel roads.

Impacts to Solid Waste Facilities

Impacts would be the same as described under the Proposed Action except that approximately 160 cubic yards less solid waste would be generated for the shorter agency preferred route.

Conclusion. An estimated 4,140 cubic yards of construction-related solid waste would be generated and disposed of in licensed landfills.

Impacts to Socioeconomic Conditions

Impacts would be the same as those described under the Proposed Action except that the Mancos Valley portion of the route would conflict with the Montezuma County resolution closing the existing utility corridor in the Mancos Valley to additional pipelines. Noise impacts would be the same as those described under the Proposed Action (Table 4-2) except for noise generated by the Dolores compressor (Table 4-4). Occupants of 24 more residences would be exposed to short-term (2 to 3 weeks) increases in pipeline construction spread-related noise and fugitive dust. Crop production would be precluded on 45 more acres for 2 years.

Operation of the pipeline would yield approximately $ 0.2 million less in property taxes. Private land area committed to long-term utility uses would increase by 161 acres. Combination of the TransColorado ROW with existing parallel ROWs would preclude installation of buildings on an average of 4 percent more area of 6 more small land parcels (fewer than 20 acres).

Conclusion. Construction of the pipeline would conflict with the Montezuma County resolution closing the existing Mancos Valley utility corridor to additional pipelines. Occupants of 66 residences would be exposed to short-term (2 to 3 weeks) increase in pipeline construction spread-related noise and fugitive dust. Crop production would be precluded on 318 acres for 2 years. Construction activities would result in employment of approximately 360 local workers and local expenditures of $5.8 million by local and non-local workers. Rental housing, motel/hotel, and RV accommodations for the construction labor force might not be adequate during the summer.

Operation of the pipeline would yield approximately $4.0 million in first year property taxes, and $10,000 in ROW fees would be paid to Federal agencies for the first year. Based on current valuations, the annualized value of timber, fuel wood, and livestock forage removed from the ROW would represent approximately 11 percent of the annual Federal ROW fees. The value of crop production precluded on 318 acres for 2 years is estimated to be $52,152. Approximately 20 persons would be employed as operational staff. Payroll for this staff would result in local expenditures of approximately $219,000 annually for goods and services. Operation of the pipeline would Increase the private land area committed to long-term utility uses by 949 acres. The combination of the TransColorado ROW with existing parallel ROWs would preclude installation of buildings on an average of 16 percent of the area of 21 small land parcels (less than 20 acres).

The Southern Utes would likely experience increased competition for sales of tribal natural gas if the TransColorado Pipeline were built. However, the extent to which this increased competition would affect sales is difficult to quantify because of uncertainties in estimating available gas supplies, future market prices, and future changes in pipeline capacity.

Impacts to Public Safety

Fatality risk would be less than that estimated under the Proposed Action by a factor of 4 percent (12 miles shorter).

Conclusion. Operation of the pipeline would result in an estimated fatality rate of one death for every 426 years of operation, based on the incident rates for the entire U.S for 1970-1984 period.

ROUTE DIFFERENCES - PROPOSED ACTION AND AGENCY PREFERRED ALTERNATIVE

As explained in Chapter 2, the Proposed Action and Agency Preferred Alternative are the same except for differences in pipeline route. The

TABLE 4-4

TransColorado Gas Transmission Project
Compressor Station Noise Impacts at Nearest Sensitive Receptors
Agency Preferred Alternative

Compressor Station	Location	Total HP	Receptor 1[1] Range (feet)	Receptor 1[1] Noise Level (dBA)[3]	Receptor 2[1] Range (feet)	Receptor 2[1] Noise Level (dBA)[3]	Receptor 3[1] Range (feet)	Receptor 3[1] Noise Level (dBA)[3]
Questar-Piceance[2]	Rio Blanco County	12,390	N/A	N/A	N/A	N/A	N/A	N/A
WestGas-Meeker	Rio Blanco County	2,700	1,800	49.8	2,600	46.7	3,400	44.3
Rocky Mountain-DeBeque	Garfield County	2,400	4,700	41.5	4,800	41.3	---	---
WestGas-DeBeque	Mesa County	2,700	1,900	49.4	2,800	46.0	3,300	44.6
TransColorado-Olathe[2]	Montrose County	4,750	N/A	N/A	N/A	N/A	N/A	N/A
Rocky Mountain Maverick[2]	Montrose County	800	N/A	N/A	N/A	N/A	N/A	N/A
Dolores	Montezuma County	5,400	1,740	50.1	1,770	50.0	1,860	49.6
Dolores Alternate 1	Dolores County	5,400	1,050	54.5	4,410	42.1	4,440	42.0
Dolores Alternate 2 (north site)	Montezuma County	5,400	315	65.0	840	56.5	1,194	53.4
Dolores Alternate 2 (south site)	Montezuma County	5,400	984	55.1	1,260	52.9	1,395	52.1

[1]Receptors are numbered by proximity to the compressor station.

[2]There were no known sensitive receptors identified within 1-mile radius of the Piceance, Olathe, Big Gypsum, and Big Gypsum Alternate sites.

[3]Day-night average sound levels (L_{dn}). Estimates based on manufacturer's data for a 6,200 hp unit with an Leg of 55 dBA at 300 feet.

routes differ in the Norwood area and in the Mancos Valley area.

Norwood Area

Proposed Action Impacts

Air Quality. Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 41 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.

Topography. Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on 11 acres for the long term (greater than 50 years). Cut-and-fill actions on side slopes greater than 40 percent would be required only where topographic constraints limit other route options. These slope alterations represent less than 1 percent of the construction ROW area.

Leasable Minerals. No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.

Mineral Materials. No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.

Water Quality. Trenching, pipe-laying, and backfilling in 3 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days.

Municipal Water Supplies. Clearing, grading, trenching, and backfilling would not occur in any municipal watersheds.

Wetlands. Pipeline construction would decrease available wetland areas by disturbing 0.3 acres of wet meadows/haylands, 0.4 acres of shrub wetlands and 0.5 acre of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction.

Soils. Construction would increase soil erosion for the short term. Generally stabilized to preconstruction levels within 2 years, some increased erosion would be expected on the entire 527 acres: saline/alkaline soils (145 acres), steep ascent/descent slopes ≥ 15 percent (64 acres), and shallow/rocky soils (118 acres) where revegetation may be more difficult. Over the long term, wind and water erosion losses and vegetation productivity losses from pipeline construction disturbance would not likely exceed those presently occurring on adjacent, undisturbed soils.

Prime Farmland and Farmland of Statewide Importance. Pipeline construction would decrease farmland areas by disturbing 0 acres of prime farmland, and 0 acres of farmlands of statewide importance. Impacts to farmlands would be short term (two growing seasons). A fraction of 1 percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.

Forestry. Clearing the ROW would decrease forestry resources by approximately 9 acres of timber resources (Douglas fir, ponderosa pine, aspen) and a decrease of 157 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.

Livestock. Clearing the ROW would decrease available grazing land by approximately 58 AUMs. This would be a short-term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.

Wildlife. ROW clearing would result in decreases in the following types of habitat: 149 acres of key mule deer range, 252 acres of key elk range, and 91 acres of sage grouse breeding nesting habitat. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline

construction for any species. Long-term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.

Fisheries. The pipeline would be constructed across 3 minor perennial streams. All are classified as Class 1 coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of streambed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.

Cultural Resources. Construction would result in the direct disturbance and data recovery of 14 projected archaeological sites within 75-feet of the ROW. The proposed route would traverse 42 miles of high-sensitivity areas and 8 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.

Visual Resources. Potentially 0 miles of high, short-and long-term visual impacts would occur along the ROW.

Transportation. Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 36 miles of dirt/gravel road.

Solid Hazardous Waste. An estimated 820 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.

Socioeconomic Conditions. The route would comply with county land use plans. Approximately 11.6 miles of the route would have to be designated as a new utility corridor by the U.S. Forest Service. Crop production would be affected within the 75-foot construction ROW for two growing seasons; 9 acres would be affected at an estimated value of $1,476. Construction and operation of the pipeline would expose 7 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 120 acres would be affected. The pipeline would not cross any parcels of less than 20 acres. First year of operation would yield an estimated $521,000 in property tax revenue.

Agency Preferred Alternative Impacts

Air Quality. Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 35 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.

Topography. Cut-and-fill actions to establish a level ROW on steep side slope terrain (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years). Cut-and-fill actions on side slopes greater than 40 percent would be required only where topographic constraints limit other route options.

Leasable Minerals. No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.

Mineral Materials. No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.

Water Quality. Trenching, pipe-laying, and backfilling in 4 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days.

Municipal Water Supplies. Clearing, grading, trenching, and backfilling would not occur in any municipal watersheds.

Wetlands. Pipeline construction would decrease available wetland areas by disturbing 3 acres of

wet meadows/haylands, 0.1 acre of shrub wetlands, and 0.7 acre of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction.

Soils. Construction would increase soil erosion for the short term. Generally stabilized to preconstruction levels within 2 years, some increased erosion would be expected on the entire 445 acres: saline/alkaline soils (0 acres), steep ascent/descent slopes ≥ 15 percent (36 acres), and shallow/rocky soils (218 acres) where revegetation may be more difficult. Over the long term, wind and water erosion losses and vegetation productivity losses from pipeline construction disturbance would not likely exceed those presently occurring on adjacent, undisturbed soils.

Prime Farmland and Farmland of Statewide Importance. Pipeline construction would decrease farmland areas by disturbing 0 acres of prime farmland, and 22 acres of farmlands of statewide importance. Impacts to farmlands would be short term (two growing seasons). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.

Forestry. Clearing the ROW would decrease forestry resources by approximately 38 acres of timber resources (Douglas fir, ponderosa pine, aspen) and a loss of 67 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.

Livestock. Clearing the ROW would decrease available grazing land by approximately 49 AUMs. This would be a short-term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.

Wildlife. ROW clearing would result in decreases in the following types of habitat: 0 acres of key mule deer range, 36 acres of key elk range, and 60 acres of sage grouse breeding nesting habitat. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long-term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.

Fisheries. The pipeline would be constructed across 4 minor perennial streams. Of these, 2 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of streambed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.

Cultural Resources. Construction would result in the direct disturbance and data recovery of 56 projected archaeological sites within 75 feet of the ROW. The preferred route would traverse 24 miles of high-sensitivity areas and 10 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.

Visual Resources. Approximately 0 miles of high, short-and long-term visual impacts would occur along the ROW.

Transportation. Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 9 miles of dirt/gravel road.

Solid Hazardous Waste. An estimated 700 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.

Socioeconomic Conditions. The route would comply with county land use plans. Approximately 1.2 miles of the route would have to be designated as a new utility corridor by the

U.S. Forest Service. Crop production would be affected within the 75-foot construction ROW for two growing seasons; 33 acres of crop loss would be affected, with an estimated value of $5,412. Construction and operation of the pipeline would expose 6 residences to short-term (2 to 3 weeks) increases in construction related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 220 acres would be affected. The pipeline would not cross any parcels of less than 20 acres. First year of operation would yield an estimated $587,000 in property tax revenue.

Mancos Valley Area

Proposed Action Impacts

Air Quality. Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 24 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.

Topography. Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years).

Leasable Minerals. No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.

Mineral Materials. No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.

Water Quality. Trenching, pipe-laying, and backfilling in 1 major river, 2 major streams, and 3 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.

Municipal Water Supplies. Construction of the pipeline would trench across one water supply stream (Dolores River).

Wetlands. Pipeline construction would decrease available wetland areas by disturbing 2.7 acres of wet meadows/haylands, 0.6 acre of wet shrublands, and 1.2 acres of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 4.5 acres of wetland soils disturbed by construction.

Soils. Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 309 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (52 acres), or rocky shallow soils (164 acres) revegetation may be more difficult. Over the long term, wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.

Prime Farmland and Farmland of Statewide Importance. Pipeline construction would decrease farmland areas by disturbing 2.7 acres of prime farmland, and 2.7 acres of farmlands of statewide importance. Impacts to farmlands would be short term (two growing seasons). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.

Forestry. Clearing the ROW would decrease forestry resources by approximately 209 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.

Livestock. Clearing the ROW would decrease available grazing land by approximately 34 AUMs. This would be a short-term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions

in stocking rates would occur in any allotments as a result of pipeline construction.

Wildlife. ROW clearing would result in vegetation decreases in 149 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long-term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.

Fisheries. The pipeline would be constructed across 1 major river, 2 major streams and 3 minor perennial streams. Of these, 5 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of streambed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.

Cultural Resources. Construction would result in the direct disturbance and data recovery of 21 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 18 miles of high-sensitivity areas and 13 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.

Visual Resources. There would be no high, short-and long-term visual impacts along the ROW.

Transportation. Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 15 miles of dirt/gravel road.

Solid Waste. An estimated 480 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.

Socioeconomic Conditions. The proposed route would require 20 miles of National Forest land to be designated as a new multiple utility corridor. These lands appear physically suitable for this purpose with the exception of the Chicken Creek Canyon crossing (MP 235P) where unstable steep slopes may limit multiple pipeline construction (Appendix A). The route would comply with county land use plans. Crop production would be affected within the 75-foot construction ROW for two growing seasons; 5 acres of crop loss would be affected, with an estimated value of $820. Construction and operation of the pipeline would expose 0 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 60 acres would be affected. The pipeline would cross 15 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 12 percent of the area of these small parcels. First year of operation would yield an estimated $472,600 in property tax revenue.

Agency Preferred Alternative Impacts

Air Quality. Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 22 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.

Topography. Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years).

Leasable Minerals. No potential conflicts with oil and gas development, and active coal, oil shale leases were identified. Future conflicts could occur on .75 square miles of coal deposits that could be strip mined.

Mineral Materials. No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.

Water Quality. Trenching, pipe-laying, and backfilling in 1 major river, 1 major stream and 2 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.

Municipal Water Supplies. Construction of the pipeline would trench across one water supply stream (Dolores River).

Wetlands. Pipeline construction would decrease available wetland areas by disturbing 0.4 acre of wet meadows/haylands, 0.5 acre of wet shrublands, and 0.7 acre of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 1.6 acres of wetland soils disturbed by construction.

Soils. Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 281 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent 50 acres, or rocky shallow soils (173 acres) revegetation may be more difficult. Over the long term, wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.

Prime Farmland and Farmland of Statewide Importance. Pipeline construction would decrease farmland areas by disturbing 20 acres of prime farmland, and 9.1 acres of farmlands of statewide importance. Impacts to farmlands would be short term (two growing seasons). A fraction of 1 percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.

Forestry. Clearing the ROW would decrease forestry resources by approximately 82 acres of timber resources (Douglas fir, ponderosa pine, aspen) and a loss of 109 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.

Livestock. Clearing the ROW would decrease available grazing land by approximately 31 AUMs. This would be a short-term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.

Wildlife. ROW clearing would result in decreases in the following types of habitat: 13 acres of key mule deer range and 77 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long-term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.

Fisheries. The pipeline would be constructed across 1 major river, 1 major stream, and 2 minor perennial streams. Of these, 3 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of streambed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.

Cultural Resources. Construction would result in the direct disturbance and data recovery of 17 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 9 miles of high-sensitivity areas and 21 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect

impacts due to unauthorized collection of surface artifacts may occur.

Visual Resources. Approximately 6.7 miles of high, short-and long-term visual impacts along the ROW would exceed the visual management objectives for these areas.

Transportation. Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 7.7 miles of dirt/gravel road.

Solid Waste. An estimated 440 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.

Socioeconomic Conditions. The preferred route is an existing utility corridor on 11 miles of National Forest land. No new designation of utility corridors would be needed. The route would not comply with county land use plans in so much as it conflicts with a Montezuma County resolution, closing the Mancos Valley to further development of pipeline corridors. Crop production would be affected within the 75-foot construction ROW for two growing seasons; 29 acres would be affected at an estimated value of $4,756. Construction and operation of the pipeline would expose 25 residences to short-term (2 to 3 weeks) increases in construction related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 97 acres would be affected. The pipeline would cross 6 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 26 percent of the area. First year of operation would yield an estimated $444,800 in property tax revenue.

NO ACTION ALTERNATIVE

If the TransColorado pipeline were not constructed, gas suppliers in the Piceance Basin would not be able to interconnect to a gas transmission line to transport natural gas to market. The surface disturbance associated with the project would not occur. Because of expected strong future economic incentives to transport gas to California and Midwest markets, an alternative proposal to connect Piceance Basin suppliers would likely be made. It is expected that development of coal bed methane would continue in the Piceance Basin, but at a potentially lower drilling rate. Other major interstate pipeline systems with which TransColorado would interconnect (El Paso, TransWestern) would likely be built if TransColorado were not constructed. Under the No Action Alternative, the Southern Utes may continue to lose an undetermined amount of royalty revenues due to their perception of a currently existing shortfall in pipeline capacity out of the San Juan Basin. The Utes claim that the current shortfall amounts to 0.619 Bcfd per year.

UNCOMMITTED MITIGATION

Nitrogen Dioxide Emissions for TransColorado Compressor Stations

Preliminary plume visibility screening analysis indicates that the NO_2 emissions from TransColorado compressor stations could result in exhaust plume visibility from Mesa Verde National Park and that the PSD NO_2 increment may be exceeded at the Questar-Piceance and Rocky Mountain-DeBeque compressor stations. TransColorado has made initial estimates of the emissions from these stations based on compressor type, horsepower, and emissions controls provided by compressor vendors. Where TransColorado emission assumptions were unavailable, the emission rates were estimated from EPA's Compilation of Air Pollutant Emission Factors (AP-42). Final designs for these compressors have not been completed. The following is a list of NO_2 emission reduction mitigation measures that may be applied to project compressors to ensure that Federal and state air quality standards are met. As indicated in the Impacts Section, the Department of the Interior will not issue a right-of-way grant if emissions during operation would violate applicable air quality standards.

The following is a list of potentially applicable technologies that can be applied to reduce NO_2

formation. A brief assessment of their relative effectiveness and demonstrated technical acceptability are provided.

Reciprocating Engine Controls

Lean Combustion. This method reduces the natural gas combustion temperature by increasing the air-to-fuel ratio. Lower combustion temperatures reduce the rate of NO_x production. Application of these controls typically can reduce NO_x emissions by 80 to 90 percent relative to no controls. This technology is widely available as a "clean burn" emissions control option.

Exhaust Gas Recirculation. This method replaces excess air in the combustion chamber with cooled and filtered exhaust gases. Application of this control approach typically can reduce NO_x emissions by as much as 80 to 90 percent relative to no controls. The proper balance of fuel, air, and exhaust gases is difficult to maintain. As a consequence this technology has not been widely demonstrated, or developed for use on pipeline compressor engines.

Selective Catalytic Reduction. This method, which can be combined with lean combustion, provides aftertreatment of exhaust gases. Ammonia (NH3) Is combined with the exhaust gases to produce nitrogen gas and water. This method requires a catalyst, an ammonia injection system, and extensive monitoring systems. This method can reduce NO_x emissions by 80 to 90 percent relative to no controls. Although this technology is commercially available, it has not been fully tested for pipeline compressor use.

Turbine Controls

Lean Combustion. This method is the same concept as that describe for reciprocating engines, and Is 70 to 90 percent effective in reducing NO_x formation. Several facilities have been installed in California using this technology.

Water/Steam Injection. This method Involves mixing water into the combustion chamber to reduce exhaust gas temperature. This method can reduce NO_x by approximately 70 to 80 percent. This technology is commercially available, but requires very high maintenance, and a supply of very clean water.

Selective Catalytic Reduction. This method is the same as that described for reciprocating engines, and involves the same application limitations.

Electrification

Electric power can be partially, or completely substituted for natural gas combustion to reduce, or eliminate all NO_x emissions from compressor stations. This method requires local availability of sufficient electric power to satisfy peak compressor station demands.

IRREVERSIBLE/ IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction and operation of the TransColorado Pipeline project could result in either the irreversible or irretrievable commitment of resources including wetlands, cultural resources, soils, timber, wildlife, and fisheries, agricultural and the socioeconomic conditions (Table 4-5). Irreversible is a term that describes the loss of future options. It applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long periods of time. Irretrievable is a term that applies to the loss of production, harvest, or use of natural resources. For example, some or all of the timber production from an area Is lost irretrievably while an area is serving as a winter sports site. The production lost is irretrievable, but the action is not irreversible. If the use changes, it Is possible to resume timber production. The monetary investment by TransColorado is not considered an irreversible or irretrievable commitment of resources. If the TransColorado project were not built, the investment that would have otherwise been spent on the TransColorado project could be spent elsewhere.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term is defined as the construction period of the TransColorado pipeline plus 1 to 4 years of ROW rehabilitation. Long-term is defined as the remaining life of the project through abandonment and reclamation. Many of the impacts associated with the TransColorado pipeline would be short term and would cease to be adverse impacts following ROW rehabilitation. No significant decreases in the productivity of the project area are expected. A tabulation of short-term and long-term impacts is presented in Table 4-5.

CUMULATIVE IMPACTS

Cumulative impacts are defined in the Council on Environmental Quality regulations 40 CFR 1508.7 as "...the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency...or person undertakes such other actions." This section describes the cumulative impacts that are currently existing and anticipated for the study area surrounding the proposed TransColorado Gas Transmission Project, addressing current and projected area development (e.g., oil and gas); management activities and authorizations on public lands (e.g., range conversion and forestry programs); land use trends; and applicable industrial/infrastructure components (e.g., utility corridors).

The cumulative study area encompasses the BLM resource areas and national forests crossed or in near proximity to the proposed project route (Table 4-6). These include the White River, Glenwood Springs, Grand Junction, Uncompahgre Basin, Gunnison, San Juan, and Farmington Resource Areas and the Grand Mesa-Uncompahgre-Gunnison and San Juan National Forests. The size of the cumulative impact area totals approximately 20,873 square miles.

Land Requirements

Associated data and acreage assumptions for activities resulting in long-term surface disturbances were obtained from the respective resource area management plans, the Colorado Oil and Gas Leasing and Development EIS (BLM 1991), and contacts with applicable Federal and state agency personnel. The time period for the cumulative impact assessment covers 5 years. Therefore, these quantified data presented in the following analysis are approximations based on both short-term (i.e., immediate) and long-term (20-year) plans.

Other activities resulting in ground disturbance affect both public and private land. Besides oil and gas development on public land, additional mineral development continues, along with residual mining material disposal. Range and forest improvements are conducted by Federal and state agencies. These activities include vegetation manipulation; livestock and wildlife improvement projects; forest management and timber harvest; and recreation facilities. Other activities associated with ground disturbance on both public and private lands include utility ROWs, ditches, and roads; water projects; and industrial/infrastructure development.

It is difficult to predict the future trends and requirements of these development and maintenance projects that would occur within the cumulative assessment area. Evaluation of past and present development formed basic assumptions for the projected 5-year cumulative assessment. Table 4-5 lists the activities associated with surface disturbance that are anticipated to continue in the study area; the number of square miles affected; and the percentage of each activity relative to the total cumulative study area. No significant cumulative effects were noted in the cumulative assessment.

The proposed TransColorado project would affect approximately 3 square miles or 0.01 percent of the entire 20,873-square-mile study area. The total area currently affected by oil and gas

TABLE 4-5

TransColorado Gas Transmission Project
Irreversible, Irretrievable, Short-Term, Long-Term
Commitment of Resources

Resource	Irreversible Impacts	Irretrievable Impacts	Relationship of Short-Term Use of Environment and Long-Term Productivity
Air Quality	No	No	The emissions from the TransColorado project would not deteriorate the existing air quality in the project area.
Water Resources	No	No	Water utilized for hydrostatic testing of the pipeline would be obtained from surface water resources. Following testing, the water would be treated and returned to the surface water source.
Wetlands	No	Yes	Removal of wetland vegetation would be a temporary impact. Following abandonment and reseeding, productivity would be restored. The long-term function of the wetland would not be altered.
Soils and Vegetation	No	Yes	Soils lost to increased erosion and vegetation production lost to conversion of land uses would be irretrievable losses. Soil erosion is expected to be short term due to implementation of reclamation measures. Long-term losses in vegetation productivity following reclamation are not expected.
Forestry	No	Yes	Loss of timber production during the life of the project would be an irretrievable loss. Following abandonment and reseeding, productivity would be restored.
Wildlife and Fisheries	No	Yes	Removal or disturbance of habitat would be a temporary impact. Long-term losses in productivity following reclamation are not expected.
Cultural	Yes	Yes	Disturbance of historic resources or disruption of cultural sites could result in the permanent loss of historical and cultural data.
Visual	No	No	Significant visual impacts would exist for the life of the project or longer until the pipeline is abandoned, aboveground structures are removed, and revegetation is complete. Removal of structures and rehabilitation of the landscape could restore the natural landscape following project abandonment.

TABLE 4-5 (CONTINUED)

Resource	Irreversible Impacts	Irretrievable Impacts	Relationship of Short-Term Use of Environment and Long-Term Productivity
Noise	No	No	Short-term noise impacts would occur to nearby residences during pipeline construction. Long-term operational noise from compressor stations would not impact sensitive receptors.
Transportation	No	No	Short-term obstruction or temporary disruption to local roads would occur during construction. There would be no long-term impacts to transportation.
Agricultural	No	Yes	Agricultural crop production would be lost for the season during construction. During the next growing season, production would be reduced but not completely lost for the first growing season. Temporary destruction of forage and temporary changes in grazing patterns could alter allotment plans. Long-term productivity would not be impaired.
Socioeconomic Conditions	No	Yes	In the short term, construction of the project would provide direct employment of an average of 1,440 workers and result in increased spending in local areas. In the long term, operations would employ 20 workers, and increased revenues would be realized by the counties and Federal land management agencies crossed by the pipeline.

TABLE 4-6

TransColorado Gas Transmission Project
Existing and Projected Estimates for Surface Disturbance Activities Occurring within the Cumulative Study Area[1]

Activities	Existing Surface Disturbance Square Miles (Percent of Total Cumulative Study Area)	Projected Surface Disturbance[2] Square Miles (Percent of Total Cumulative Study Area)
Total Cumulative Study Area = 20,873 mi^2		
Proposed TransColorado Project	N/A	3 (0.01)
Oil and Gas Development	22 (0.11)	25 (0.12)
Range/Water Improvements	728 (3.5)	768 (3.7)
Timber Harvest/Forest Management	407 (1.9)	435 (2.1)
Access Roads (oil gas/timber harvest)	22 (0.11)	25 (0.12)
Utility ROWs	6 (0.03)	6 (0.03)
Total	1,174 (5.6)	1,259 (6.0)

[1]Estimates based on applicable BLM Resource Area Management Plans, Forest Service Land and Management Plans, BLM 1991, and applicable agency contacts.

[2]Cumulative assessment projected 5 years.

development is estimated to be 22 square miles, representing 0.11 percent of the entire study area. Within the 5-year period, oil and gas development may affect a total of 25 square miles of land, or about 0.12 percent of the area. The emphasis of the cumulative impact analysis is to determine, using the quantified estimates, whether the amount of surface disturbance resulting from the TransColorado Gas Transmission Project would substantially add to the existing and projected surface disturbance activities occurring within the cumulative study area. The percentage of surface disturbance associated with this project is small in comparison with the overall study area, particularly when compared to existing and future programs and activities.

Air Quality

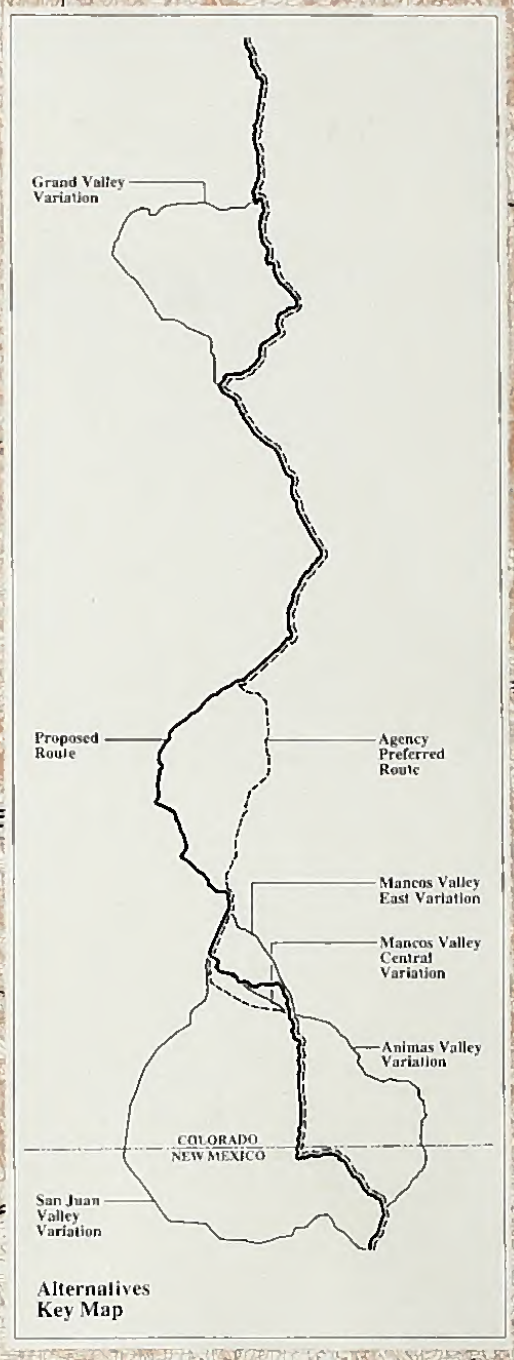
Potential air pollution emissions from the proposed project would have cumulative effects in the Four Corners region when combined with a number of existing and foreseeable sources (e.g.; coal-fire power plants, refineries, agricultural burning, etc.). These include the projects listed in Table 1-2 located in Montezuma and La Plata Counties Colorado, and San Juan County, New Mexico. Of primary concern are small, localized sources of oxides of nitrogen (NO_x), which may cause cumulative haze visibility and atmospheric deposition effects throughout the region. The State of Colorado (Air Pollution Control Division), USDI-National Park Service, USDA-Forest Service, and the Bureau of Land Management have met to cooperatively address this issue. However, potential cumulative air quality impacts are unknown at this time.

Interactions with Foreseeable Projects

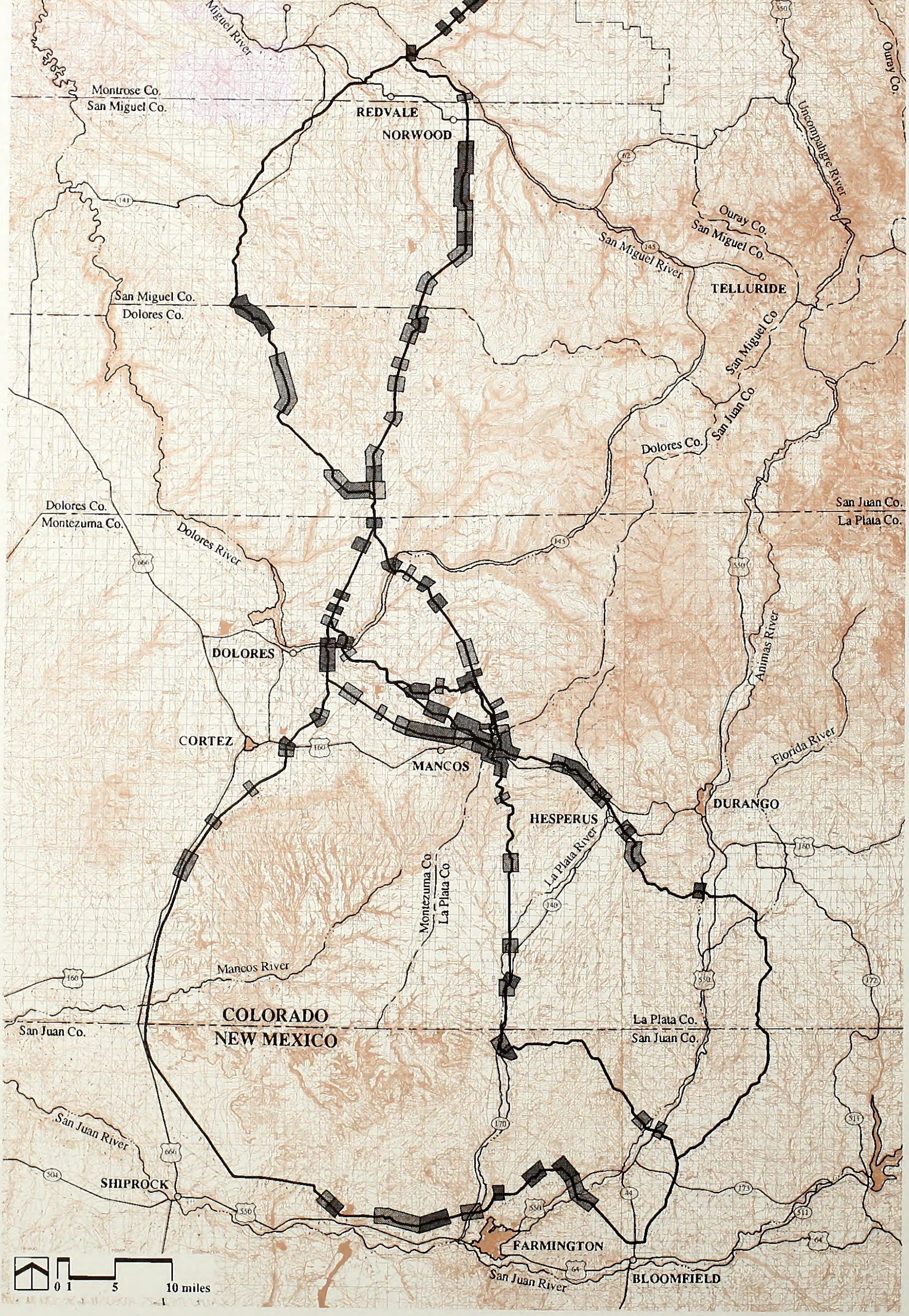
One foreseeable project (Table 1-2), the Northwest Pipeline expansion, would be constructed along approximately 11 miles of an existing pipeline corridor in the Mancos Valley of Montezuma County, Colorado, that would be shared with the TransColorado agency preferred route. Approximately 8 to 9 miles of the Northwest looping project would be located on the north side of this corridor adjacent to the existing Northwest ROW; the TransColorado pipeline would be located on the south side of the ROW. The Northwest loop would parallel the proposed TransColorado ROW on the south side of the utility corridor for a distance of 2.5 miles. Based on this configuration, construction of the Northwest project and the TransColorado project would add an additional 67 acres to the land committed to this pipeline corridor. This addition of the Northwest and TransColorado ROWs would represent approximately a 46 percent increase in the long-term commitment to pipeline utility land uses in the area where the two pipeline projects would parallel each other.

Local housing would be impacted by the presence of two separate construction spread crews. TransColorado expects to employ an average of 480 persons, bringing another 324 dependents into the area. If it is assumed that this figure were doubled as a result of simultaneous construction schedules, over 1,600 persons would be employed or dependents of those employed. Of these, using the same assumptions as in the socioeconomics analysis in this EIS, 240 would be local residents and 1,360 persons would migrate into the area. It has previously been documented that in the Durango area, rental housing, such as apartments, and RV sites are severely limited, although motel rooms are adequate. It is probable that the large majority of workers would reside in the town of Cortez or in one of the municipalities in San Juan County, New Mexico. In 1989, Cortez had an estimated population of 7,101 and San Juan County, 85,000. If it is assumed that a third of the 1,360 non-local workers sought and found accommodations in Cortez, the town's population would increase by 6 percent. If the entire estimated work force were to seek accommodations in San Juan County, the population would temporarily increase by 2 percent. Impacts associated with population would include tightening of the rental markets, potential competition with tourists for accommodations, and demands on public services. These impacts would be short term.

Piceance Creek
Rio Blanco Co.
Garfield Co.
Roan Creek
Colorado River
Garfield Co.
Mesa Co.
DE BEQUE
Plateau Creek
Colorado River
PALISADE
GRAND JUNCTION
Mesa Co.
Delta Co
Gunnison River
DELTA
Delta Co.
Montrose Co.
Dolores River
Mesa Co.
Montrose Co.
MONTROSE
Montrose Co.
Ouray Co.
NUCLA
San Miguel River
Montrose Co.
San Miguel Co.
REDVALE
NORWOOD
Ouray Co.



Alternatives Key Map



VISUAL IMPACTS
FIGURE 4-1

High
Visual Contrast Exceeds Management Objectives

Moderate
Visual Contrast at Limits of Management Objectives

Low
Visual Contrast Well Below Limits of Management Objectives

Note:
Due to map scale limitations, small units, in some cases, have been incorporated into larger adjacent units.
Graphic representation of impact levels are somewhat generalized on this map as a result.

TRANSCOLORADO GAS TRANSMISSION PROJECT

CHAPTER 5

CONSULTATION AND COORDINATION

CONSULTATION AND COORDINATION

In the course of preparing the draft EIS for the TransColorado Gas Transmission Project, the BLM and Forest Service have communicated with and received input from many Federal, state, and local agencies; elected representatives; environmental and citizens' groups; industries, and individuals. Many of these people participated in agency scoping meetings held in June 1990 and in public scoping meetings held in July and October 1990. A summary of the scoping process and the scoping comments received are presented in Chapter 1. The following agencies, groups, and individuals have provided input to this draft EIS.

Federal Government Agencies

Department of Agriculture
- Soil Conservation Service

Department of the Army
- Corps of Engineers

Department of Energy
- Western Area Power Administration

Department of the Interior
- Bureau of Indian Affairs
- Bureau of Mines
- Bureau of Reclamation
- Fish and Wildlife Service
- National Park Service
- Geological Survey

Department of Transportation

Federal Energy Regulatory Commission

Environmental Protection Agency

Advisory Council on Historic Preservation

State Government Agencies

Colorado

- Department of Natural Resources
  - Division of Water Resources
  - Division of Wildlife
- Department of Health
  - Division of Air Quality
- Department of Highways
- Department of Parks and Outdoor Recreation
  - Natural Areas Program
- Public Utilities Commission

New Mexico

- Department of Fish and Game
- Department of Health
  - Air Quality Division
  - Water Quality Division
  - Environmental Improvement Division
- State Land Office
- Interstate Stream Commission
- Department of Minerals
  - Oil Conservation Division

Indian Tribes

Navajo Nation

Southern Ute Tribe

Ute Mountain Tribe

Hopi Tribe

Local Governments

Colorado

Rio Blanco County
- County Planner
- County Assessor

Garfield County
- County Planner
- County Assessor

Mesa County
- Board of Commissioners
- County Planner
- County Assessor
- City of Palisade
- City of Grand Junction

Delta County
- County Planner
- County Assessor

Montrose County
- County Planner
- County Assessor

San Miguel County
- County Planner
- County Assessor

Dolores County
- County Planner
- County Assessor

Montezuma County
- Board of Commissioners
- County Planner
- County Assessor

La Plata County
- County Planner
- County Assessor

New Mexico

San Juan County
- County Planner
- Department of Roads

U.S. Senators and Representatives

Benjamin Nighthorse Campbell

Environmental Groups

Sierra Club
Western Colorado Congress

Industries and Individuals

(Detailed list available upon request from Chuck Finch, BLM, Montrose District Office, Montrose, Colorado).

DRAFT EIS PREPARERS AND REVIEWERS

ENSR Consulting and Engineering

This draft EIS was prepared by ENSR Consulting and Engineering, an environmental and engineering consulting firm, under the direction of the BLM and Forest Service. Following are the individuals who participated in the preparation and review of this draft EIS.

	EDUCATION AND EXPERIENCE	DRAFT EIS RESPONSIBILITY
ENSR CORE TEAM		
Scott Ellis	B.S. Biology and English 17 Years Experience	Project Manager

	EDUCATION AND EXPERIENCE	DRAFT EIS RESPONSIBILITY
Eric Berg	B.S. Wildlife Biology M.S. Range-Wildlife Management 8 Years Experience	Assistant Project Manager, Natural Resource Manager
Karin Sable	B.A. Economics 3 Years Experience	Project Coordinator Human Resource Manager
Drew Sheesley	B.S. Biology 1 Year Experience	Data Collection/Analysis Editing
Nancy Beauprez	M. Ed. Adult and Higher Education B.S. Journalism 15 Years Experience	Project Editor
Jane Hanson	12 Years Experience	Word Processing Document Preparation
Judy Brown	7 Years Experience	Word Processing Document Preparation
Diane Sutton	5 Years Experience	Word Processing Document Preparation
ENSR TECHNICAL SPECIALISTS		
Jon Alstad	B.S. Animal Science M.S. Range Science 6 Years Experience	Vegetation, Soils
William Berg	B.S. Geology M.S. Geology 12 Years Experience	Geology, Minerals Paleontology
Robert Conzemius	B.A. Chemistry M.S. Meteorology 1 Year Experience	Air Quality
Rollin Daggett	B.S. Zoology M.S Aquatic Biology 15 Years Experience	Aquatic Resources
Daniel Gregory	B.A. Geology M.S. Geology 12 Years Experience	Water Resources
Kathleen Klein	B.S. Resource Economics 6 Years Experience	Water Resources
Lori Nielson	B.S. Wildlife Biology 7 Years Experience	Editing Human Resources
James Nyenhuis	B.A. History M.A. Communication Research M.S. (Pending) Soil Science 12 Years Experience	Soils

	EDUCATION AND EXPERIENCE	DRAFT EIS RESPONSIBILITY
William Theisen	B.S. Natural Resources M.S. Recreation Resources 9 Years Experience	Human Resources Corridor Analysis
Centennial Archaeology, Inc.		
Christian Zier	Ph.D. Anthropology M.A. Anthropology 20 Years Experience	Cultural Resources
Andrea Barnes	B.A. Anthropology 11 years experience	Cultural Resources
EDAW INC.		
Craig Taggart	B.S. Zoology MLA - Landscape Architecture 15 Years Experience	Visual Resources Graphics
Lee Howe	10 Years Experience	Graphics

BLM/Forest Service Core and Interdisciplinary Teams

	EDUCATION AND EXPERIENCE	DRAFT EIS RESPONSIBILITY
Chuck Finch BLM Montrose District Office	B.S. Forestry 27 Years Experience	Project Manager, Lands and Realty
Joann Graham BLM Grand Junction District Office	Undergraduate work toward B.A. English 14 Years Experience	NEPA Compliance, Planning and Environmental Coordination
Miles Weaver Supervisor's Office, Grand Mesa, Uncompahgre, and Gunnison National Forests	B.S. Forestry 28 Years Experience	FS Project Coordinator, Visual Resources Recreation
Jim Ferguson BLM Montrose District, Uncompahgre Resource Area	B.S. Wildlife Management 15 Years Experience	T&E Species/Wildlife Fisheries
Michael Burke Supervisor's Office, San Juan National Forest	B.S. Geotechnical Engineering 12 Years Experience	Engineering-Geology Transportation
Dennis Murphy BLM Montrose District Office	B.S. Forestry/Watershed Management 13 Years Experience	Soils/Water

Technical Review and Project Coordination

	DRAFT EIS RESPONSIBILITY
Lillian Stone, P.E. Department of the Interior, Office of Environmental Affairs	NEPA Compliance
Michael Boyle Federal Energy Regulatory Commission	NEPA Compliance Review
Diana Menapace Forest Service Regional Office	NEPA Compliance Review
Ben Wallingford Forest Service Regional Office	Lands and Realty Review
Richard Fike BLM Montrose District Office	Cultural Resources Coordination and Paleontology Review
Scott Archer BLM Colorado State Office	Air Quality Review
Jeff Ulrich Supervisor's Office, Grand Mesa, Uncompahgre, and Gunnison National Forests	Socioeconomics Review
Bill Hensley BLM Montrose District Office	Livestock Grazing Review
Vern Rholl BLM Craig district, White River Resource Area	Project Coordination
Tom Bargsten BLM Grand Junction District, Grand Junction Resource Area	Project Coordination
John Davis BLM Montrose District, Uncompahgre Resource Area	Project Coordination
Kathryn Bulinski BLM Montrose District Office, San Juan Resource Area	Project Coordination
Jerry Crockford BLM Albuquerque District, Farmington Resource Area	Project Coordination
Kay Zillich San Juan National Forest, Mancos Ranger District	Project Coordination
John Reidinger San Juan National Forest, Dolores Ranger District	Project Coordination
Lew French Grand Mesa, Uncompahgre and Gunnison National Forests, Ouray Ranger District	Project Coordination

DRAFT EIS RESPONSIBILITY	
Wayne Quade Grand Mesa, Uncompahgre and Gunnison National Forests, Norwood Ranger District	Project Coordination

DRAFT EIS DISTRIBUTION

The following agencies and individuals were sent copies of this draft EIS.

Federal Agencies

Forest Service
Corps of Engineers
Bureau of Reclamation
Bureau of Mines
Environmental Protection Agency
National Park Service
Department of the Interior
Congressional Representatives
Bureau of Indian Affairs
Advisory Council on Historic Preservation
Fish and Wildlife Service
Soil Conservation Service
Federal Energy Regulatory Commission
Western Area Power Administration
U.S. Department of Transportation

Colorado State Agencies

Colo. State Clearing House
Department of Natural Resources
State Land Board
Governors' Office
Colorado State University
University of Colorado
Department of Agriculture
Department of Local Affairs, Division of Planning
Department of Highways
State Historic Preservation Officer
Division of Parks and Recreation
State Engineer
State Forest Service
Division of Wildlife
State Geologist
Department of Health, Air Pollution and Water Quality Control Divisions
Colorado Oil and Gas Conservation Commission

New Mexico State Agencies

Energy and Minerals Department
Environmental Improvement Division
Oil Conservation Division
State Planning Division
Department of Game and Fish
State Land Office
Division of Conservation Archaeology
State Engineering Office
State Highway Department

Local Governments

Northwest Colorado Council of Governments
Assoc. Governments of NW Colorado
County Commissioners and Highway Departments in:
Rio Blanco, Garfield, Mesa, Delta, Montrose, San Miguel, Dolores, La Plata, and Montezuma Counties in Colorado and San Juan County - New Mexico.
San Juan County Highway Department in New Mexico

Other Organizations

Colo. Wildlife Federation
Independent Petroleum Assoc. of Mountain States
Sierra Club
Club 20
Colorado Environmental Coalition
Colo. Native Plant Society
Nature Conservancy
Rocky Mountain Oil & Gas Assoc.
Western Colorado Congress
Wilderness Society
American Wilderness Alliance

Other Organizations (Continued)

Colo. Mountain Club
Wildlife Society
Nature Conservancy
American Wilderness Alliance
Audubon Society of Western Colorado
Western Association of Land Users
Colorado Native Plant Society
Dolores Sportsman's Association
Trout Unlimited
Florida Conservancy District
Southern Ute Agency
Ute Mountain Ute Agency
Wildlife Society
Rocky Mountain Elk Foundation
Independent Gas Producers Corporation
Independent Petroleum Assoc. of New Mexico
Fort Lewis College
National Audubon Society
Native Plant Society of New Mexico
Navajo Tribe
New Mexico Cactus & Succulent Society
New Mexico Cattle Growers Assoc.
New Mexico Oil & Gas Assoc.
New Mexico Wildlife Federation
Colorado Open Space Council
Colorado Wool Growers
San Juan Archaeological Society
Anasazi Historical Society
Society of American Foresters
Trust for Public Land

Numerous companies and individuals expressing interest were sent copies of the draft EIS.

REFERENCES

Algermissen, S. T., D. M. Perkins, P. C. Thenhaus, S. L. Hanson, and B. L. Bender. 1982. Probabilistic Estimates of Maximum Acceleration and Velocity in Rock in the Contiguous United States. U.S. Geological Survey Open File Report 82-1033.

Angeles Pipeline Project EIS. 1987. ENSR Consulting and Engineering (formerly ERT). California Department of Transportation and U.S. Forest Service. August 1987.

Baldwin, C. 1991. Range Conservationist, Uncompahgre National Forest. Personal communication with E. Berg, ENSR Consulting and Engineering, February 1991.

Beck, K. G. 1991. Extension Weed Science Specialist, Colorado State University. Personal communication with J. Alstad, ENSR Consulting and Engineering, February 1991.

Bonser, R., Director, LaPlata County Planning Department. Written communication with K. Sable, ENSR Consulting and Engineering. October 25, 1990.

Braun C. 1991. Research Biologist. Colorado Division of Wildlife. Fort Collins, Colorado. Personal communication with E. Berg, ENSR Consulting and Engineering, June 3, 1991.

Brooks, T. 1986. Geohydrology and Potential Hydrologic Impacts of Underground Coal Mining in the Rapid Creek Basin, Mesa County, Colorado. U.S. Geological Survey, Water Resources Investigations Report 86-4172. 28 pp.

Brown, D. E. 1982. Desert Plants - Biotic Communities of the American Southwest - United States and Mexico. Volume 4, Numbers 1-4.

Bruner J. 1991. Representative Southern Ute Indian Tribe, Colorado. Personal communication with S. Ellis, ENSR Consulting and Engineering, June 11, 1991.

Bureau of the Census. 1988. County and City Data Book, A Statistical Abstract, Supplement 1988, U.S. Department of Commerce.

BLM. 1977. The Effects of Surface Disturbance on the Salinity of Public Lands in the Upper Colorado River Basin. Denver, Colorado.

_____. 1978. The Effects of Surface Disturbance on the Salinity of Public Lands in the Upper Colorado River Basin - 1977 Status Report.

_____. 1984a. Piceance Basin, Draft Resource Management Plan and Environmental Impact Statement.

_____. 1984b. San Juan/San Miguel, Draft Resource Management Plan and Environmental Impact Statement.

_____. 1985. Grand Junction Resource Area, Draft Resource Management Plan and Environmental Impact Statement.

_____. 1987a. Farmington, Draft Resource Management Plan, Farmington Resource Area.

_____. 1987b. Uncompahgre Basin, Draft Resource Management Plan and Environmental Impact Statement, Uncompahgre Basin Resource Area.

_____. 1987c. Grand Junction Resource Area Resource Management Plan and Record of Decision. BLM, Grand Junction District, Colorado. January 1987.

_____. 1988. Farmington Resource Management Plan. Albuquerque District, Farmington Resource Area, New Mexico. July 1988.

_____. 1990. Wildlife Data from BLM Grand Junction RA, Uncompahgre RA, Durango RA, and Farmington RA files.

Bureau of Reclamation (BuRec). 1986. General map, Animas La Plata Project. Scale 1" = 6.5 miles.

_____. 1987. General map, Dolores Project. Scale 1" = 5.5 miles.

_____. 1959. General map, Florida project Scale 1" = 6.5 miles.

_____. 1991. Upper Colorado Region, Durango Projects Office. Written communication with Chuck Finch, Project Manager, Bureau of Land Management. July 12, 1991.

Bush, E. 1991. Geologist, New Mexico Oil Conservation Division. Personal Communication with K. Sable, ENSR Consulting and Engineering, June 3, 1991.

Butler, 1991. Dolores County Commissioner's Office. Personal communication with Kathleen Klein, ENSR Consulting and Engineering, January 23, 1991.

Chandler, M., J. C. Horn, and A. D. Reed. 1991. Revised Cultural Resource Overview for the Proposed TransColorado Natural Gas Pipeline, Western Colorado and Northwestern New Mexico. Report prepared for Woodward-Clyde Consultants, Oakland, California by Alpine Archaeological Consultants, Inc., Montrose, Colorado.

Chandler, S. Alpine Archaeology. Personnel communication with A. M. Barnes, Centennial Archaeology, February 1991.

Christensen, T. 1991. Recreational Forester, Bureau of Land Management. Personal communication with E. Berg and K. Sable, ENSR Consulting and Engineering, February 1991.

Clark, B. 1990. Senior Wildlife Biologist, Colorado Division of Wildlife, Montrose. Personal communication with E. Berg, ENSR Consulting and Engineering, December 1990.

Cochran, W. 1991. United States Bureau of Mines, Intermountain Field Operations Center, Denver, Colorado. Personal communication with B. Berg, ENSR Consulting and Engineering.

Colorado Division of Local Government. 1990-1991. Division of Local Affairs. Data request for TransColorado, Socioeconomics.

REFERENCES

Colorado Division of Wildlife (CDOW). 1990a. Stream Data Bank. Denver, Colorado.

_____. 1990b. Overlay Maps for Big Game, Sage Grouse, and Threatened and Endangered Wildlife.

Colorado Natural Areas Program. 1990. Data request for TransColorado Pipeline, Sensitive Plants.

Cook, M. 1991. Director Energy Resource Division, Southern Ute Indian Tribe Colorado. Written communication with C. Finch, BLM Montrose, May 23, 1991.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deep Water Habitats of the United States. USFWS, Office of Biological Services, Washington, D.C.

Delta County. 1990. Administrative Regulations of Major Facilities of a public Utility in Delta County.

Dickerson, J. 1991. Range Conservationist, San Juan National Forest. Personal communication with E. Berg, ENSR Consulting and Engineering, February 1991.

Dolores county. 1990. Dolores County Roadway utility Use Policy.

ENSR Consulting and Engineering. 1991. Summary Report of the Spring 1991 Nesting Raptor Survey for the Proposed and Agency Preferred TransColorado Pipeline Routes.

Environmental Protection Agency (EPA). 1985. Compilation of Air Pollutant Emission Factors, 4th Edition. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park N.C. AP-42.

_____. 1990a. CERCLIS Site Location Listing for San Juan County, New Mexico. U.S. EPA Superfund Program, Region VI, Dallas, Texas.

_____. 1990b. CERCLIS Site Location Listing for Colorado. U.S. EPA Superfund Program, Region VIII, Denver, Colorado.

Exxon, Wyoming. 1991. Dakota Pipeline Segment 2 and Hartzog Draw Unit CO_2 Projects EA.

Federal Energy Regulatory Commission (FERC). Mojave-Kern River - El Dorado Natural Gas Pipeline Projects FEIR/FEIS, Volumes 1-4, December 1987.

_____. 1988. Order Establishing Guidelines for the Submission of Required Data, Docket No. CP87-451-006.

_____. 1991. PGT/PG&E and Altamont Natural Gas Pipeline Projects DEIS, January 1991.

Ferguson, J. 1991. Bureau of Land Management. Wildlife Biologist, Uncompahgre Resource Area. Personal communication with L. Nielsen, ENSR Consulting and Engineering, February 21, 1991.

REFERENCES

Fike, Keith. Senior Planner, Mesa County Planning Department. Information and written communication with K. Sable. ENSR Consulting and Engineering, October 29, 1990.

Finch, W. I., A. C. Huffman, Jr., and J. E. Fassett (eds.). 1989. Coal, Uranium, and Oil and Gas in Mesozoic Rocks of the San Juan Basin: Anatomy of a Giant Energy-Rich Basin. Twenty-Eighth International Geologic Congress, Field Trip Guidebook T120.

Flack, R. 1990. Director, San Juan County Road Department. Personal communication with K. Sable, ENSR Consulting and Engineering, November 21, 1990.

Fowler, B. 1991. Range Conservationist, Bureau of Land Management, White River District. Personal communication with K. Sable, ENSR Consulting and Engineering, February 20, 1991.

Garfield County 1979. Zoning Resolution and Amendments, Garfield County, Colorado.

Giffen, C. 1991. Range Conservationist, Bureau of Land Management, Durango. Personal communication with K. Sable, ENSR Consulting and Engineering, January 29, 1991.

_____. 1991. Range Conservationist, Bureau of Land Management, Durango, Resource Area. Personal communication with E. Berg, ENSR Consulting and Engineering, February 1991.

Goodman, E. 1991. San Juan County Assessor's Office. Personal communication with K. Sable, ENSR Consulting and Engineering, February 1991.

Hammerson, G. A. 1982. Amphibians and Reptiles in Colorado. Colorado Division of Wildlife, Denver, CO.

Harrington, H. D. 1954. Manual of the Plants of Colorado. 666 pp.

Housing Data Base Files, 1989. Reviewed by K. Sable, ENSR Consulting and Engineering, November 15, 1991.

Houghton & Woodwell. 1989. "Global Climate Change," Scientific American. Volume 260 No. 4, April 1989.

Husband, M. B. 1984. Colorado Plateau Country Historic Context. Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver, CO.

Jarrell, B. 1991. Timber Staff, Uncompahgre National Forest. Personal communication with K. Sable, ENSR Consulting and Engineering, February 13, 1991.

Johnson, C. 1991. San Miguel County Assessor's Office. Personal communication with K. Sable, ENSR Consulting and Engineering, February 1991.

Jones, D. C., J. E. Schultz, and D. K. Murray. 1978. Coal Resources and Development Map of Colorado. Colorado Geological Survey Map Series 9.

Jones, G. 1991. Timber Staff, San Juan National Forest. Personal communication with K. Sable, ENSR Consulting and Engineering, February 13, 1991.

REFERENCES

Jurgens. 1991. State Range Conservationist. Soil Conservation Service, Denver, Colorado. Personal communication with E. Berg, ENSR Consulting and Engineering, December 1990.

Kennedy, R. 1990. Southwest Community Resources, Durango. Personal communication with K. Sable, ENSR Consulting and Engineering, December 1990.

Kenton, S. 1991. Montrose County Assessor's Office. Personal communication with K. Sable, ENSR Consulting and Engineering, February 1991.

Kirkham and Rogers. 1981. Earthquake Potential of Colorado. Colorado Geological Survey Bulletin, Number 43.

Knox, C. 1990. Assistant Planner, San Miguel County Planning. Personal communication with K. Sable. ENSR Consulting and Engineering, November 16, 1990.

Komatinsky, J. 1990. Director, Department of Development, Rio Blanco County. Written communication with k. Sable, ENSR Consulting and Engineering. October 31, 1990.

Kuuskraa, V. A. and C. F. Brandenburg. 1989. Coal Bed Methane Sparks a New Energy Industry. Oil and Gas Journal, October 9, 1989, 49-56 pp.

LaPlata County. 1990. LaPlata County Permit System Appendices.

_____. 1990. LaPlata County Permit System.

_____. 1990. LaPlata County Comprehensive Lead Use Plan, Element 1 - Policy Plan.

Leininger, W. C. 1988. Non-Chemical Alternatives for Managing Selected Plant Species in the Western United States. 47 p.

Leske, D. 1990. Site Manager, Grand Junction Uranium Mining Tailings Remediation Act Program, U.S. Department of Energy. Personal communication with K. Sable, ENSR Consulting and Engineering, October 26, 1990.

Lyon, J. L. and A. L. Ward. 1982. Elk and Land Management. Pages 443-477 in J. W. Thomas and D. E. Towgill, eds. Elk of North America: Ecology and Management. Stackpole Books, Harrisburg, PA.

Mallory, W. W. (ed). 1972. Geologic atlas of the Rocky Mountain Region. Rocky Mountain Association of Geologists, 331 pp.

McAninch, C. D., R. L. Hoover, and R. C. Kufeld. 1984. Silvicultural Treatments and Their Effects on Wildlife. Pages 211-242 in R. L. Hoover and D. L. Wills, eds, Managing Forested Lands for Wildlife. Colorado Division of Wildlife in Cooperation with USDA Forest Service, Rocky Mountain Region, Denver, Colorado.

Mesa County. 1988. Land-use and Development Policies.

Metcalf, B. 1991. Delta County Assessor's Office. Personal communication with K. Sable, ENSR Consulting and Engineer, February 1991.

REFERENCES

Montrose County. 1988. Uncompahgre Valley Master Plan

_____. 1983. Montrose County Zoning Resolution.

Mountain West, Inc. 1979. Pipeline Construction Workers and Community Impact Surveys Report.

Murphy D. 1991. Staff specialist, BLM Montrose, Colorado. Written comment on PDEIS to ENSR Consulting and Engineering, May 1991.

Murray, D. K. 1976. Energy Resource Development Map of Colorado. Colorado Geological Survey Map Series No. 6, Scale 1:500,000.

National Academy of Sciences (NAS). 1977. Guidelines for Preparing Environmental Impact Statements. Washington, D.C.

Navajo Nation Historic Preservation Department. n.d. Navajo National Policy to Protect Traditional Cultural Properties (draft). Navajo Nation Historic Preservation Department, Window Rock, AZ.

Navajo Natural Heritage Program. 1990. Data request for the TransColorado Pipeline Sensitive Plants and Wildlife.

New Mexico Department of Game and Fish (NMDGF). 1988. Handbook of Species Endangered in New Mexico. Sante Fe, New Mexico.

_____. 1991. B. Culp District Wildlife Officer. Farmington, New Mexico. Personal communication with E. Berg, ENSR Consulting and Engineering. June 12, 1991.

NOAA. 1974. U.S. National Oceanic and Atmospheric Administration, Climates of the States: Volume II - Western States.

O'Rourke, P. M. 1980. Frontier in Transition: A History of Southwestern Colorado. Bureau of Land Management, Cultural Resources Series No. 10. Denver, CO.

Peterson, B. 1991. Soil Conservation Service, Farmington, New Mexico. Personal Communication with J. Alstad, ENSR Consulting and Engineering, June 13, 1991.

Radbruch-Hall, D. H., R. B. Colton, W. E. Davies, B. A. Skipp, I. Lucchitta, and D. J. Varnes. 1976. Landslide Overview Map of the Conterminous United States. U.S. Geological Survey Miscellaneous Field Studies Map MF-771, Scale 1:7,500,000.

Reed, D.F. 1981. Conflicts with Civilization. Pages 509-536 in O. C. Wallmo, ed. Mule and Black-tailed Deer of North America, University of Nebraska Press, Lincoln, NE.

Rightmire, C. T., G. E. Eddy, and J. N. Kirr (eds.). 1984. Coal Bed Methane Resources of the United States. American Assoc. of Petroleum Geologists, Studies in Geology Series No. 17.

REFERENCES

Rio Blanco County Planning Commission. 1983. Rio Blanco County master Plan. April 1983 Revisions.

_____. 1976. Rio Blanco County Master Plan for Public Ways and Public Utilities.

Roberts, R. 1991. Bureau of Land Management. Wildlife Biologist, White River Resource Area. Personal communication with L. Nielsen, ENSR Consulting and Engineering, February 21, 1991.

Rose, K. 1990. Wildlife Biologist, USFWS, Grand Junction. Personal communication with E. Berg, ENSR Consulting and Engineering, June 1990.

Sakry, S. 1991. Agricultural Statistician, Colorado Agricultural Statistics Service. Personal communication with K. Sable, ENSR Consulting and Engineering, February 28, 1991.

Salazar, K. 1991. National Natural Landmark Representative, National Park Service. Personal communication with K. Caddies - Burrell, ENSR Consulting and Engineering, July 1991.

San Miguel County. 1990. San Miguel County Land Use Code.

Scanlon, A. H. 1983. Oil and Gas Fields Map of Colorado. Colorado Geological Survey Map Series No. 22, Scale 1:500,000.

Schwochow, S. D. 1981. Inventory of Non-Metallic Mining and Processing Operations in Colorado. Colorado Geological Survey Map Series No. 17.

Sedgwick, J. A. and R. H. Ryder. 1987. Effects of Chaining Pinyon-Juniper or Nongame Wildlife. Pages 541-551 in R. L. Everett, Compiler, Proceedings - Pinyon-Juniper Conference. USDA Forest Service, Intermountain Research Station. Gen. Techn. Rep Int-215.

Shaver, C. 1991. National Park Service. Personal communication with Scott Archer, Bureau of Land Management, July 17, 1991.

U.S. Soil and Conservation Service (SCS). 1978. Soil Survey of Mesa County Area, Colorado.

_____. 1979a. Important Farmlands of Mesa County, Colorado. Maps.

_____. 1979b. Important Farmlands of LaPlata County, Colorado. Maps.

_____. 1979c. Important Farmlands of Garfield County, Colorado. Maps.

_____. 1979d. Important Farmlands of Delta County, Colorado. Maps.

_____. 1980a. Important Farmlands of Colorado, State Summary and Map. 12 pp.

_____. 1980b. Important Farmlands of Montrose/Ouray Counties, Colorado - Uncompahgre Valley Area. Map.

_____. 1980c. Soil Survey of San Juan County, New Mexico, Eastern Part Map.

_____. 1980d. Soil Survey and Interpretations of Southwest Montrose and Northwest and Northcentral San Miguel Counties, Colorado. Interim Report and Maps.

_____. 1981a. Soil Survey of Paonia Area, Colorado - Parts of Delta, Gunnison, and Montrose Counties. Maps.

_____. 1981b. Soil Survey of LaPlata County Area, Colorado. Maps.

_____. 1982a. Important Farmland Inventory - Colorado. 68 pp.

_____. 1982b. Important Farmlands - San Juan County, New Mexico. Map.

_____. 1982c. Soil Survey of Rio Blanco County Area, Colorado. Maps.

_____. 1985. Soil Survey of Rifle Area, Colorado - Parts of Garfield and Mesa Counties. Maps.

Shomaker, J. W. (ed.), et al. 1971. Strippable Low-Sulfur Coal Resources of the San Juan Basin in New Mexico and Colorado. State Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Memoir 25.

Skiba, G. 1991. Wildlife Biologist, Colorado Division of Wildlife, Durango, Colorado. Personal communication with E. Berg, ENSR Consulting and Engineering, June 12, 1991.

Smith, P. 1991. Regional Transportation Manager, Denver, Rio Grande, and Western Railroad. Personal communication with K. Sable, ENSR Consulting and Engineering, January 23, 1991.

Stevens, D. 1991. Forester, Bureau of Land Management, Grand Junction. Personal communication with K. Sable, ENSR Consulting and Engineering, February 4, 1991.

Stone, J. 1991. U.S. Bureau of Mines, Denver, Colorado. Personal communication with B. Berg, ENSR Consulting and Engineering, July 1, 1991.

Stovall, J. 1991. Range Conservationist, Bureau of Land Management, Farmington Resource Area. Personal communication with E. Berg, ENSR Consulting and Engineering, February 1991.

Stover, C. W., B. G. Reagor, and S. T. Algermissen. 1988. Seismicity Map of the State of Colorado. U.S. Geological Survey Miscellaneous Field Studies Map MF-2036, Scale 1:1,000,000.

Swinsky, B. 1991. Personal communication with J. Alstad, ENSR Consulting and Engineering. January 1991.

Thompson, L. 1990. Planner, San Juan County. Personal communication with K. Sable, ENSR Consulting and Engineering, November 21, 1990.

Thygerson, G. 1991. Range Conservationist, Bureau of Land Management, Grand Junction Resource Area. Personal communication with E. Berg, ENSR Consulting and Engineering, February 1991.

REFERENCES

TransColorado. 1990 (as Amended 1991). TransColorado Gas Transmission Project Draft Plan of Development. January 1991.

_____. 1991. Plan of Development, March 1991.

_____. 1991. San Juan Basin Gas Supplies and Pipeline Capacities.

Tremain, C. M. 1984. Coal Bed Methane Resources of Colorado. Colorado Geological Survey Map Series 19, Scale 1:500,000.

USDA-REA. 1983. Rifle to San Juan 345-kV Transmission Line and Associated Facilities - Supplemental Draft Environmental Impact Statement.

_____. 1983a. Northern States Bald Eagle Recovery Plan. Northern States Bald Eagle Recovery Team. USFWS Reference Service, Bethesda, MD.

U.S. Forest Service (USFS). 1983B. Land and Resource Management Plan for the San Juan National Forest. September 1983.

_____. 1987. Land and Resource Management Plan for the Grand Mesa, Uncompahgre, and Gunnison National Forests, Amendment 4, "The Recreation Appendix." May 1987.

U.S. Fish and Wildlife Service (USFWS). 1990. List of Federally Listed, Proposed and Candidate Species That May Occur Within the Proposed TransColorado Project Area of Influence. Grand Junction, Colorado.

_____. 1984. American Peregrine Falcon Rocky Mountain/Southwest Population Recovery Plan. Rocky Mountain/Southwest Peregrine Falcon Recovery Team, USFWS Reference Service, Bethesda, MD.

_____. 1982 Northern States Bald Eagle Recovery Plan. Denver, Colorado.

_____. 1991A. Draft Sensitive Species List. Rocky Mountain Region, Colorado. Lakewood, Colorado

_____. 1991B. Draft Survey Protocols and Interim Management Guidelines for the Mexican Spotted Owl. Region 3, USFS.

Weaver, T. 1990. Administrator, Montezuma County. Personal communication with K. Sable, ENSR Consulting and Engineering, November 7, 1990.

Whitney, J. W. 1981. Surficial Geologic Map of the Grand Junction 1°x 2° Quadrangle, Colorado and Utah. Miscellaneous Investigations Series Map I-1289, Scale 1:250,000.

Williams, P. L. 1964. Geology, Structure, and Uranium Deposits of the Moab Quadrangle, Colorado and Utah. U.S. Geological Survey Miscellaneous Investigations Series Map I-360, Scale 1:250,000.

Woodward-Clyde Consultants (WCC). 1990. Environmental Report for the TransColorado Gas Transmission Company, Natural Gas Transportation Company.

REFERENCES

Yeend, W. E. 1969. Quaternary Geology of the Grand and Battlement Mesas Area, Colorado. U.S. Geological Survey, Professional Paper 617. 50 p.

Yost, C. 1991. Bureau of Land Management, Farmington, New Mexico. Personal communication with B. Berg, ENSR Consulting and Engineering, June 10, 1991.

Youd, T. L. and D. M. Perkins. 1987. Mapping of Liquefaction Severity Index. Journal of Geotechnical Engineering, Vol. 113, No. 11, 1374-1392 pp.

GLOSSARY

Alkalinity -- Quantity and type of compounds in water which collectively cause a pH shift to alkalinity.

Animal Unit Months (AUM) - Amount of forage required to sustain a cow/calf unit for one month.

Areas of Critical Environmental Concern -- A BLM designation pertaining to areas where specific management attention is needed to protect and prevent irreparable damage to important historical, cultural, and scenic values, fish or wildlife resources, or other natural systems or processes, or to protect human life and safety from natural hazards.

Benthic -- Of, pertaining to, or living in or on the bottom of a waterbody.

Bored Crossing -- A subterranean crossing of a road, railway, river, or other obstacle, by a pipeline, transmission line, or other transport system.

Category (1, 2, 3A, 3B, 3C) -- Plants and animals being considered for federal threatened and endangered status are placed in one of the following categories:

1. Available data on biological vulnerability and threat(s) support listing, but additional data are needed on precise habitat and/or critical habitat boundaries.

2. Available data indicate that listing may be appropriate, but substantial data on vulnerability and threats are not available to support immediate listing.

3A. Probably extinct.

3B. Taxa do not meet the U.S. Fish and Wildlife Service definition of species; taxa may be re-evaluated in the future.

3C. Taxa that have proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat; further research may indicate re-evaluation to Category 1 or 2.

Clean Air Act -- Federal legislation governing air pollution.

Prevention of Significant Deterioration (PSD) -- A regulatory program based not on the absolute levels of pollution allowable in the atmosphere but on the amount by which present air quality will be allowed to deteriorate in a given area. Under this program, geographic areas are divided into three classes, each allowing different increases in increments of total suspended particulates and sulfur dioxide concentrations.

Class I--minimal additional deterioration in air quality (certain national parks and wilderness areas).

Class II--moderate additional deterioration in air quality (most lands).

Class III--greater deterioration for planned maximum growth (industrial areas).

Cogeneration -- Production of fuel-fired steam sold initially (usually to a utility) to generate electricity and subsequently to a private enterprise for product processing.

COMPLEX I -- EPA air pollution computer model for use in complex terrain.

Corridor -- For purposes of this environmental assessment, a wide strip of land within which a proposed linear facility could be located.

Cow-Calf Livestock Operation -- A livestock operation in which a base breeding herd of mother cows and bulls is maintained. The cows produce a calf crop each year, and the operation keeps some heifer calves from each calf crop for breeding herd replacements. The operation sells the rest of the calf crop between the ages of 6 and 12 months along with old or non-productive cows and bulls.

Crucial Habitat -- An area that is essential to the survival of any wildlife species sometime during its life cycle.

Cultural Resource Inventory Classes:

Class I--Existing data inventory: an inventory study of a defined area designed (1) to provide a narrative overview (cultural resource overview) derived from existing cultural resource information and (2) to provide a compilation of existing cultural resource site record data on which to base the development of the BLM's site record system.

Class III--An intensive field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a specified area. A Class III inventory is appropriate on small project areas, all areas to be disturbed, and primary cultural resource areas.

Cumulative Impact -- The impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Debitage -- Waste flakes from tool making activities.

Desiccation -- The removal of moisture; to become dried up.

Diurnal -- Describes a cyclic event recurring daily; or the nature or habit of an organism to be active during daylight hours.

Emission -- Effluent discharge into the atmosphere, usually specified by mass per unit time.

Endangered Species -- Any animal or plant species in danger of extinction throughout all or a significant portion of its range.

Enhanced Oil Recovery -- Any enhanced recovery of oil undertaken after secondary operations. Since enhanced oil recovery usually follows water flooding, enhanced oil recovery generally is considered among the more exotic oil recovery processes such as miscible displacement, thermal recovery or chemical flooding.

Ephemeral Stream -- A stream that flows only in direct response to precipitation.

Federal Listed Species -- Animal or plant species listed by the USFWS as threatened or endangered.

Floodplain -- The flat ground along a stream which is covered by water when the stream overflows its banks at flood stages.

Forage -- All browse and herbaceous foods available to grazing animals, which may be grazed or harvested for feeding.

Fossil -- Any remains, trace or imprint of a plant or animal that has been preserved by natural processes in the earth's crust since some past geologic time.

Free Market -- An economic market operating by free competition.

Fugitive Dust -- Airborne particles emitted from any source other than through a stack.

Global Warming -- Widely recognized but controversial theory on atmosphere effects from air pollution resulting in warmer surface temperatures.

Habitat -- A specific set of physical conditions that surround the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover and living space.

Highest and Best Use -- Use of a resource (i.e., property) which maximizes its potential.

Historic -- Archaeological and archivally known sites related to the activities of non-native peoples, whether they be of Euro-American, Afro-American or Asian-American origin, in the period after the European discovery of the New World (ca. A.D. 1492).

Hydrostatic Test -- The closing of all openings and pumping water into the pipe at a pressure greater than the normal operating pressure to locate leaks or prove that there are no leaks.

Impact -- The change from an existing condition (baseline) caused by an action (such as construction or operation of a pipeline or facilities).

Incised Channels -- Deeply and sharply cut stream channels.

Increments -- Maximum allowable increases over baseline concentrations of pollutants covered by the Prevention of Significant Deterioration (PSD) provisions in Class I, II, and III areas.

Infrastructure -- The facilities, services, and equipment needed for a community to function. It includes roads, sewers, water lines, police and fire protection, and schools.

Immigrant -- Individual who moves into the project area from another part of the country.

Intermittent Stream -- A stream or reach of a stream that is below the local water table for at least some part of the year.

Lek -- An area where grouse gather for ritualistic display and breeding; also, a sage grouse strutting ground.

Level of Service (LOS) -- In transportation studies, a qualitative measure of traffic flow along a given road considering a variety of factors, including speed and travel time, traffic interruptions and freedom to maneuver. Levels of service are designated A through F -- A being a free-flow condition with low volumes at high speeds and F being a congested condition of low speeds and stop-and-go traffic. Intermediate levels describe conditions between these extremes. A level of service below C involves unstable to forced traffic flow in which a driver's freedom to select a speed is restricted and in which traffic stoppages cause congestion.

Liquefaction -- A change in the phase of a substance to the liquid state; usually a change from the gaseous to the liquid state, especially of a substance which is a gas at normal pressure and temperature.

Lithic Scatter -- A scatter of chipped stone materials which may include fragments, flakes or stone tools.

Mitigation -- The abatement or reduction of a construction or operation impact to the environment by (1) avoiding a certain action or parts of an action, (2) employing certain construction measures to limit the degree of impact, (3) restoring an area to pre-construction conditions, (4) preserving or maintaining an area throughout the life of a project, (5) replacing or providing substitute resources to the environment, or (6) gathering archaeological and paleontological data before disturbance.

National Ambient Air Quality Standards (NAAQS) -- The allowable concentrations of air pollutants in the air specified by the federal government in Title 40, Code of Federal Regulations, Part 50. The air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public welfare from any unknown or expected adverse effects of air pollutants). Welfare includes effects on soils, water, crops, vegetation, manufactured materials, animals, wildlife, weather, visibility and climate, damage to and deterioration of property, and hazards to transportation. Also included are effects on economic values and on personal comfort and well-being.

National Natural Landmarks -- Sites designated by the Secretary of the Interior as containing the best representative examples of geologic features and natural communities composing the nation's natural history. Purpose of the designation is to encourage preservation of such sites through well-informed management and use, and consideration of these sites in public and private land use planning. Designation has no legal effect on land ownership, use or management (National Park Service, Not Dated, National Natural Landmark Designation).

Navajo Natural Heritage Program -- A program designed to preserve and protect the natural resources on the Navajo Nation tribal lands.

Non-Conventional Energy Sources -- Energy sources not commonly used (e.g., solar energy).

Noxious Weed -- An undesirable weed species which can crowd out more desirable species.

Off-Highway Vehicle (OHV) -- A vehicle (including four-wheel drive, trail bikes, all-terrain vehicles, and snowmobiles but excluding helicopters, fixed-wing aircraft and boats) capable of traveling off road over land, water, ice, snow, sand, marshes and other terrain.

Paleontology -- A science dealing with the life of past geological periods as known from fossil remains.

Palustrine -- A system of wetlands that includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens.

Particulate -- A particle of soil or liquid matter -- soot, dust, aerosols, fumes and mist.

Perennial Stream -- A stream receiving water from both surface and underground sources that flows throughout the entire year.

pH -- A numeric value that gives the relative acidity or alkalinity of a substance on a 0 to 14 scale with the neutral point at 7. Values lower than 7 show the presence of acids, and values greater than 7 show the presence of alkalis.

Plan of Development -- A mandatory plan, developed by an applicant of a mining operation or construction project, that specifies the techniques and measures to be used during construction and operation of all project facilities on public land. The plan is submitted for approval to the appropriate federal agency before any construction begins.

GLOSSARY

Prehistoric -- Archaeological sites resulting from the activities of aboriginal peoples native to this region, and because dating is often difficult, extending up to the reservation era (ca. A.D. 1868).

Prime Farmland -- Land that is best suited for producing food, feed, forage, fiber and oilseed crops. The inventory of prime agricultural land is maintained by the U.S. Department of Agriculture, Soil Conservation Service.

Proposed Action -- Construction activities, alignments and other activities proposed by the applicant.

Reclamation -- The process of converting disturbed land to its former use or other productive uses.

Riparian -- Living or located on a river bank (e.g., riparian vegetation).

Riverine -- A system of wetlands that includes all wetland and deep water habitats contained within a channel that lacks trees, shrubs, persistent emergents, and emergent mosses or lichens.

Salinity -- A measure of the amount of dissolved salts in water.

SCREEN -- EPA air pollution screening computer model.

Scraper Trap -- A device on the pipeline used to receive a scraper pig or inside pipe inspection pig.

Scoping -- Determination of significant environmental issues and concerns related to a proposed action.

Sensitive Plant Species -- Plants whose populations are consistently small and widely dispersed or whose ranges are restricted to a few localities, such that any appreciable reduction in numbers, habitat availability, or habitat condition might lead toward extinction. Sensitive plants also include species rare in one locality but abundant elsewhere. See Endangered Species and Threatened Species.

Soil Productivity -- The capacity of a soil to produce a plant or sequence of plants under a system or management.

Threatened Species -- Any plant or animal species likely to become endangered within the foreseeable future throughout all or part of its range.

Total Suspended Particulates (TSP) -- A pollutant that refers to the amount of dust in the air.

Vegetation Type -- A plant community with distinguishable characteristics described by the dominant vegetation present.

Visual Resource Management Class (VRM Class) -- The degree of visual change acceptable within the existing characteristic landscape. An area's classification is based upon the physical and sociological characteristics of any given homogeneous area and serves as a management objective.

Wilderness Study Area (WSA) -- A roadless area or island that has been inventoried and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act and Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

Work Force -- The total number of workers on a specific project or group of projects. The work force is also referred to as direct employment and primary employment.

ABBREVIATIONS AND ACRONYMS

ACEC	=	Area of Critical Environmental Concern
AUM	=	Animal unit months
bbls	=	Barrels of oil
BIA	=	Bureau of Indian Affairs
BLM	=	Bureau of Land Management
CCR	=	Colorado Code of Regulations
CDH	=	Colorado Department of Highways
CDOW	=	Colorado Division of Wildlife
CFR	=	Code of Federal Regulations
cfs	=	Cubic feet per second
CO_2	=	Carbon dioxide
CPS	=	Community profile statistics
dBA	=	Decibels
DOE	=	U.S. Department of Energy
DOT	=	U.S. Department of Transportation
EC	=	Electrical conductivity
EIS	=	Environmental impact statement
EPA	=	Environmental Protection Agency
EVC	=	Existing visual conditions
FERC	=	Federal Energy Regulatory Commission
gpm	=	Gallons per minute
L_{dn}	=	Day-night average noise levels
LOS	=	Level of service
MBF	=	Thousand board feet
MCF	=	Thousand cubic feet
MFP	=	Management framework plan
MMBF	=	Million board feet
MMcfd	=	Million cubic feet per day
MP	=	Milepost
NAAQS	=	National Ambient Air Quality Standards
NEPA	=	National Environmental Policy Act
NMGF	=	New Mexico Department of Game and Fish
NPDES	=	National Pollution Discharge Elimination System
NRHP	=	National Register of Historic Places
PJ	=	Pinyon-juniper
POD	=	Plan of development
PSD	=	Prevention of Significant Deterioration
REO	=	Regional environmental overview
RMP	=	Resource management plan
ROW	=	Right-of-way
RV	=	Recreational vehicle
RVD	=	Recreation visitor days
SAR	=	Sodium adsorption ratio
SRMA	=	Special recreation management area
SWA	=	State wildlife area
TCF	=	Trillion cubic feet
TPY	=	Tons per year
UMTRAP	=	Uranium Mine Tailings Remedial Action Project
USFS	=	U.S. Forest Service
USFWS	=	U.S. Fish and Wildlife Service
USGS	=	U.S. Geological Survey
VAC	=	Visual absorption capability
VQO	=	Visual quality objectives

ABBREVIATIONS AND ACRONYMS

VRM	=	Visual resource management classes
WCC	=	Woodward-Clyde Consultants
WSA	=	Wilderness study area
$\mu g/m^3$	=	Micrograms per cubic meter

APPENDIX A

TRANSCOLORADO GAS TRANSMISSION PROJECT
UTILITY CORRIDOR ANALYSIS FOR POSSIBLE FOREST LAND AND RESOURCE MANAGEMENT PLAN AMENDMENTS IN ASSOCIATION WITH THE PROPOSED TRANSCOLORADO GAS TRANSMISSION PROJECT

APPENDIX A

TRANSCOLORADO GAS TRANSMISSION PROJECT UTILITY CORRIDOR ANALYSIS FOR POSSIBLE FOREST LAND AND RESOURCE MANAGEMENT PLAN AMENDMENTS IN ASSOCIATION WITH THE PROPOSED TRANSCOLORADO GAS TRANSMISSION PROJECT

Grand Mesa, Uncompahgre, and Gunnison National Forests

and

San Juan National Forest

Introduction

The purpose of this analysis is to describe the environmental effects and determine the suitability of designating potential, new utility corridors on the Uncompahgre and San Juan National Forests in association with the proposed TransColorado Gas Transmission project. A Forest Land and Resource Management Plan Amendment would be needed to designate new utility corridors on each forest. This analysis is included as an appendix of the TransColorado Natural Gas Transmission Pipeline EIS.

Purpose and Need

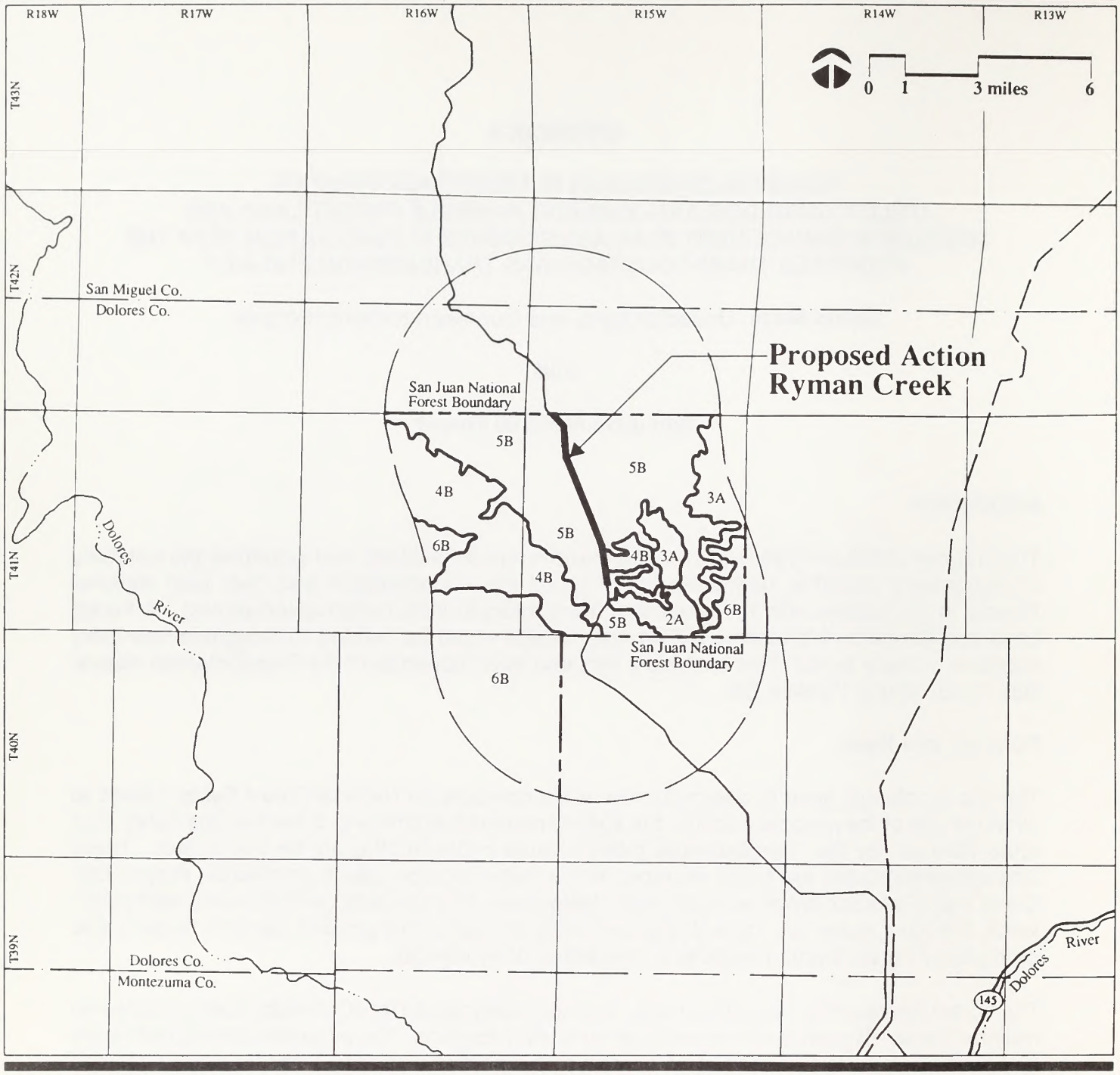
There is a potential need to designate new utility corridors on National Forest System lands to allow the use of the proposed action, the agency preferred alternative, or the Mancos Valley East route variation for the TransColorado pipeline route in the ROW grant for the project. These single-pipeline routes are being analyzed in the TransColorado Gas Transmission Project EIS. Some TransColorado pipeline routes are in designated utility corridors on National Forest System lands, but other routes are not in designated utility corridors. The pipeline can only be permitted on National Forest System lands in a designated utility corridor.

The Forest Service (FS) must determine if the non-designated TransColorado pipeline routes on National Forest System lands are suitable for a utility corridor. The potential utility corridors are being analyzed for their suitability to contain four pipelines similar to TransColorado's 22-inch pipeline in an average 250-foot-wide corridor. TransColorado pipeline routes being considered for a potential utility corridor on National Forest System lands are shown on Figures A-1, A-2, and A-3.

Forest Land and Resource Management Plan Amendment

A Forest Land and Resource Management Plan Amendment may be needed for the TransColorado Gas Transmission project for the following reasons:

- The Rocky Mountain Regional Guide, which gives direction for Forest Land and Resource Management Plans (forest plans) requires that pipelines of 10 or more inches in diameter be in a designated utility corridor. (The proposed TransColorado pipeline is 22 inches.)



Requiring New Corridor Designation

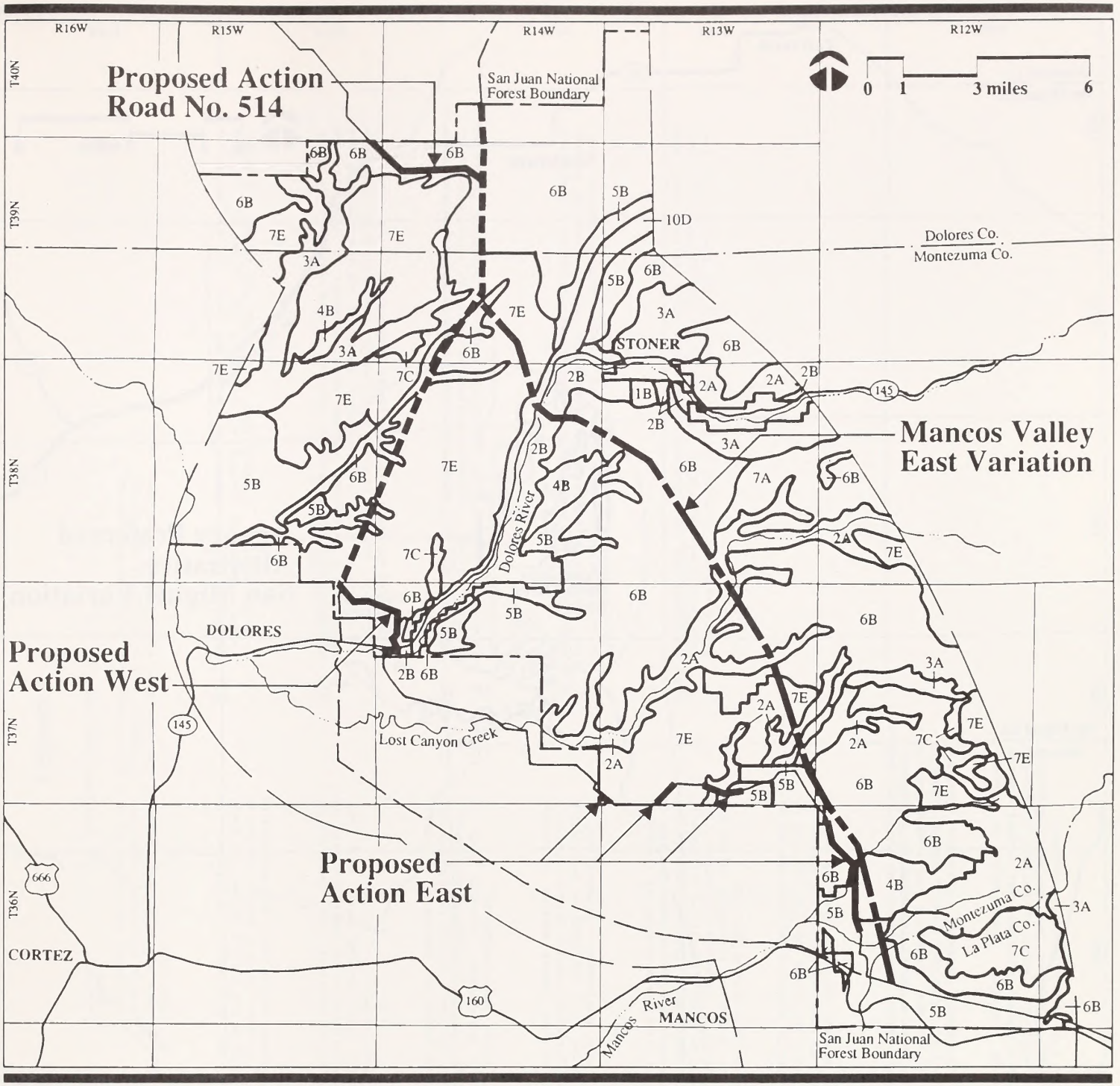
5B Management Area

POTENTIAL UTILITY CORRIDORS ON NATIONAL FOREST SYSTEM LANDS

San Juan National Forest

FIGURE A-1

TRANSCOLORADO GAS TRANSMISSION PROJECT



Requiring New Corridor Designation

Utility Corridor for 345 KV Transmission Line Only (Management Area 1D)

Designated Utility Corridor (Management Area 1D)

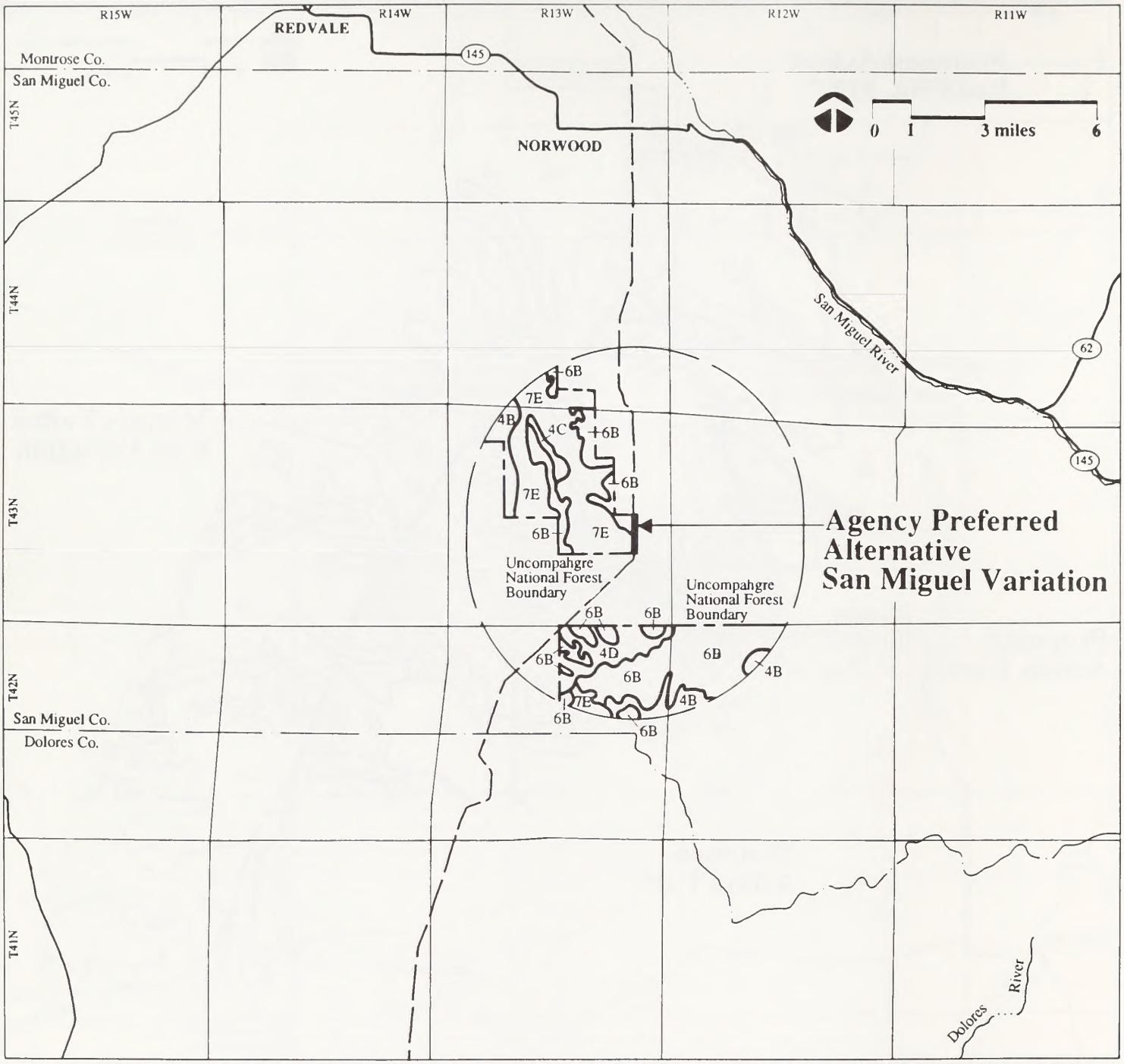
7E Management Area

POTENTIAL UTILITY CORRIDORS ON NATIONAL FOREST SYSTEM LANDS

San Juan National Forest

FIGURE A-2

TRANSCOLORADO GAS TRANSMISSION PROJECT



Requiring New Corridor Designation

6B Management Area

POTENTIAL UTILITY CORRIDORS ON NATIONAL FOREST SYSTEM LANDS

Uncompahgre National Forest

FIGURE A-3

TRANSCOLORADO GAS TRANSMISSION PROJECT

Legend

MANAGEMENT AREA DIRECTION

Management area direction is a mix of management practices designed to attain particular objectives. Management area direction is applied to each management area based on the management emphasis prescribed for that area.

1B MANAGEMENT AREA 1B - Provides for the maintenance, development and expansion of downhill ski area sites by the private sector. In areas presently undeveloped, management for other resource uses is limited so that opportunity for ski area development is not lost. Forested land is not suitable for timber production.

1D MANAGEMENT AREA 1D - Provides for utility corridors. Management activities within these linear corridors strive to be compatible with the management goals of the management areas through which they pass. Corridors are mapped with symbols (See Legend).

2A MANAGEMENT AREA 2A - Emphasizes semi-primitive motorized recreation opportunities such as snowmobiling, four-wheel driving and motorcycling both on and off roads and trails in a naturally appearing environment. Management activities are visually subordinate. Forested lands in portions of the area are not suitable for timber production.

2B MANAGEMENT AREA 2B - Emphasizes rural and roaded natural recreation opportunities such as driving for pleasure, viewing scenery, and picnicking along sensitive travel routes while enhancing or maintaining scenic qualities inherent in a forest environment. Forested land is suitable for timber production.

3A MANAGEMENT AREA 3A - Emphasizes semi-primitive non-motorized recreation opportunities. Other resource uses occur if they are compatible with or enhance this type of recreation experience. Forested land is not suitable for timber production; however, wood products are available if harvest is compatible with semi-primitive dispersed recreation. The area is never open for motorized recreation activities except for specifically identified motorized corridors through the area.

4B MANAGEMENT AREA 4B - Emphasizes wildlife habitat management for one or more indicator species. Roaded natural recreation opportunities will be provided, but vegetation treatment and human activities are managed to provide optimum habitat for the selected species. Forested land is suitable for timber production.

4C 4C. MANAGEMENT AREA - Wildlife habitat management in hardwood and shrub dominated draws and other areas of woody vegetation on rangelands. Semi-primitive non-motorized, semi-primitive motorized and roaded natural recreation opportunities will be provided. Livestock grazing will be compatible with wildlife habitat management. Vegetation treatment will enhance plant and animal diversity.

4D 4D. MANAGEMENT AREA - Wildlife habitat management in aspen. Semi-primitive non-motorized, semi-primitive motorized and roaded natural recreation opportunities will be provided. Aspen is managed to provide wildlife habitat, wood products, visual quality and plant and animal diversity. Livestock grazing will be compatible with wildlife habitat management.

5B MANAGEMENT AREA 5B - Emphasizes forage and cover on wildlife winter ranges. Livestock grazing is compatible but is managed to favor wildlife habitat. Forested land is suitable for timber production.

6B MANAGEMENT AREA 6B - Emphasizes livestock grazing througb use of intensive grazing management systems and investments in structural and non-structural range improvements. Conflicts between livestock and wildlife are resolved in favor of livestock. Forested lands in portions of the area are not suitable for timber production.

7C MANAGEMENT AREA 7C - Emphasizes production and utilization of wood-fiber on steep slopes. Management activities, although visually dominant, harmonize and blend with the natural setting. Dispersed recreation opportunities are available.

7E MANAGEMENT AREA 7E - Emphasizes production and utilization of wood-fiber for sawtimber on gentle slopes. Management activities are not evident or remain visually subordinate along primary roads and trails. Dispersed recreation opportunities are available.

10D MANAGEMENT AREA 10D - Protects and maintains river corridors which have been determined eligible for inclusion in the National Wild and Scenic Rivers System. Forested land is not suitable for timber production.

- The Grand Mesa, Uncompahgre, and Gunnison National Forests, and San Juan National Forest Plans provide specific locations and direction for utility corridors in Management Area Prescription 1D (see Attachment No. 1). Management emphasis is for major oil and gas pipelines, major water transmission and slurry pipelines, electrical transmission lines, and transcontinental telephone lines.

- Some TransColorado Gas Transmission project routes being considered in the EIS for the project are not in designated utility corridors. This means that if they were to be selected for the permitted route, these routes would not be consistent with the forest plan.

- Forest Service Manual 1922.51 states that one need to amend a forest plan is "Findings that existing or proposed permits, contracts, cooperative agreements, and other instruments authorizing occupancy and use are not consistent with the forest plan but should be approved (36 CFR 219.10(e))."

Designating new utility corridors would be done only if:

- The route being considered is determined to be suitable for a utility corridor for the TransColorado project and other future pipelines.

- The route is selected to be the permitted route for the TransColorado project.

Issues

While the potential need to designate new utility corridors on National Forest System lands was noted during public scoping meetings for the TransColorado project, there were not any specific issues raised by the public in this regard. It was noted that the 345 kV power line corridor was not a good corridor for a pipeline and that some people felt the forest was not the proper place for a pipeline. The issues raised to date by the agencies and company involved in the TransColorado project EIS are:

- The FS rationale for determining that the potential utility corridors should accommodate at least four pipelines similar to the proposed TransColorado pipeline (22-inch). TransColorado feels that a utility corridor can be for one or more pipelines. The FS feels that if a utility corridor is to be designated, it should accommodate a reasonable number of utilities proposed for possible future construction in that area. The number four is based on the fact that there are now three pipelines in the Mancos corridor with two more proposed (Northwest and TransColorado). The FS feels it is not unreasonable to project that a route for four may be needed in the future, particularly with the oil and gas development potential for the region and the nation's energy needs.

- Agency policies on utility corridor designation differ between the BLM and the FS. Pipelines do not always need to be in a utility corridor on BLM lands and, when they are, the corridor does not necessarily have to accommodate more than one pipeline.

- Whether there is really a need for a new utility corridor in the Mancos Valley area. Because of private landowners' concerns, the Montezuma County commissioners "closed" the existing corridor in 1986 by placing a moratorium on additional pipelines in it. Landowners were worried about the impacts the pipeline construction and operation had on them and their failure to obtain satisfactory results from the pipeline companies. In past studies and to date, it has been shown that there would be fewer impacts to natural resources in the existing corridor than in areas studied as route alternates around the Mancos Valley. There has been no technical evidence to suggest that the existing utility corridor is fully occupied or would sustain an unpredicted impact that does not already exist on the utility corridor location.

Proposed Action, Agency Preferred Alternative, and Route Variations

The potential, new utility corridors on National Forest System lands are being analyzed for their suitability to contain four pipelines similar to TransColorado's 22-inch pipeline in an average 250-foot-wide corridor contained within the milewide analysis area being studied for the routes in the TransColorado EIS. See the Introduction - Issues for the rationale for using four pipelines. It is assumed that future pipelines to be placed in the potential utility corridors will use the same construction techniques and environmental protection measures for the TransColorado project.

TransColorado pipeline routes being considered for a potential, new utility corridor on National Forest System lands are (see Figures A-1 through A-3):

- On the San Juan National Forest:

  - Proposed Action - Ryman Creek (MP 187.7P to MP 195.1P). The proposed route in the Ryman Creek area (Sec. 6, 7, 8, 17, 20, 21, 28, 32, and 33; R15W; T41N). (See Figure A-1).

  - Proposed Action - Road No. 514 (MP 203.2P to MP 207.1P). The proposed route along Road No. 514 (Sec. 4, 5, and 6; R14E - Sec. 1; R15E; all T39N). (See Figure A-2).

  - Proposed Action - West (above Dolores - MP 219.6P to MP 222.6P). The proposed route between the existing utility corridor (230-kV powerline) and the Dolores River Canyon crossing (Sec. 1; R15E - Sec. 6 and 7; R14E; all T37N). (See Figure A-2).

  - Proposed Action - East (above Mancos - MP 231.2P to MP 246.0P). The proposed route starting southwest of Joe Moore Reservoir, running west and then south to Mancos Hill (Sec. 31, 32, 34, and 35; R13W; T37N - Sec. 31; R12W; T37N - Sec. 6, 7, 8, 17, 20, and 29; R12W; T36N). (See Figure A-2).

  - Mancos Valley East Variation (MP 0.0P to MP 24.0P). The Mancos Valley East route variation starting at the 230-kV power line utility corridor heading southeast following the 345-kV power line to the utility corridor on Mancos Hill. This route is now designated as a utility corridor for power lines only (see Figure A-2).

- On the Uncompahgre National Forest:

  - Agency Preferred Alternative - San Miguel Variation (MP 19.6 to MP 20.8). The Agency Preferred south of Norwood, Colorado in Section 23, T43N, R13W. (Figure A-3).

Forest Service Proposed Action

Designate the Agency Preferred Alternative - San Miguel Variation as a new utility corridor through a forest plan amendment. This would correspond with the Agency Preferred Alternative in the TransColorado Project draft EIS. The forest plan amendment would designate the utility corridor route location on a forest plan map and apply management area prescription 1D to the utility corridor. (See Figure A-3 and attachment No. 1).

Alternatives

Designate those routes listed below that are determined suitable as a new utility corridor that are selected for the TransColorado project ROW grant. Designation of a new utility corridor would be through a forest plan amendment that shows the utility corridor location on a forest plan map and applies management area prescription 1D to the utility corridor. (See Figure A-1 and attachment No. 1.)

The alternative routes are: Proposed Action - Ryman Creek, Road No. 514, West and East, and Mancos Valley East Variation.

No Action Alternative

No potential utility corridor routes would be designated if: 1) the routes are not determined to be suitable for a utility corridor; and 2) the routes are not selected for the TransColorado Project ROW Grant.

Affected Environment

TransColorado Draft EIS - Proposed Action

Proposed Action - Ryman Creek. The proposed route - Ryman Creek potential utility corridor crosses the San Juan National Forest for approximately 7.7 miles (MP 187.4P to MP 195.1P) and is located in Dolores County, Colorado. The land cover in this area is predominantly shrubland and pinyon-juniper. The corridor traverses approximately 20 feet of wetlands as identified from aerial photo interpretation. In addition, the corridor crosses approximately 3.2 miles of rocky/shallow soils.

The corridor parallels Ryman Creek for approximately 5.0 miles. The main stem of Ryman Creek has incised and evolved to the advanced stage where vegetation has become established on the sediment that has aggraded in the bed of the channel. The corridor crosses approximately 0.9 mile of incised channel. Major mass movement features occur in the headwaters of Ryman Creek and on the slopes of Glade Mountain. Geologic mapping of the area shows several east-west trending normal faults, one of which forms the north face of the mountain. The corridor

crosses approximately 0.2 mile of landslide areas. There are no active faults identified in this area.

The corridor parallels Forest Road 240 for approximately 4.0 miles. According to the San Juan National Forest Land and Resource Management Plan (1983), approximately 70 percent of the corridor crosses forest plan management category 5B, 5 percent crosses management category 4B, and 25 percent crosses lands other than National Forest. Management area 5B emphasizes forage and cover on wildlife winter ranges. Livestock grazing is compatible but is managed to favor wildlife habitat. Forested land is suitable for timber production. New roads other than short-term, temporary roads are located outside of the management area. Short-term roads are obliterated within one season after intended use. Existing local roads are closed and new motorized recreation use is managed to prevent unacceptable stress on big game animals during the primary big game use season. Management area 4B emphasizes wildlife habitat management for one or more indicator species. Roaded natural recreation opportunities are provided along forest arterial and collector roads, but vegetation treatment and human activities are managed to provide optimum habitat for the selected species. Forested land in this management area is also suitable for timber production.

Proposed Action - Forest Road 514. The proposed route - Forest Road 514 potential utility corridor crosses the San Juan National Forest for approximately 3.9 miles (MP 203.2P to MP 207.1P) and is located in Dolores County, Colorado. The corridor parallels Forest Road 514 for its entire length. The land cover in this area is predominantly grassland/rangeland with some ponderosa pine and shrubland. The corridor traverses approximately 15 feet of wetlands at the Beaver Creek crossing. In addition, the corridor crosses approximately 2.1 miles of rocky/shallow soils.

The entire corridor crosses forest plan management category 6B. Management area 6B emphasizes livestock grazing through use of intensive grazing management systems and investments in structural and non-structural range improvements. Conflicts between livestock and wildlife are resolved in favor of livestock. Forested lands in portions of the area are not suitable for timber production. Dispersed recreational opportunities vary between semi-primitive non-motorized and roaded natural. The entire corridor is located within a very high visual constraint area. The corridor does not cross any known geologic hazards.

Proposed Action - West. The proposed route - West potential utility corridor crosses the San Juan National Forest for approximately 3.0 miles (MP 219.6P to MP 222.6P) and is located in Montezuma County, Colorado. The land cover crossed by the corridor is predominantly ponderosa pine with some shrubland, agricultural, and stream/riparian areas. The corridor traverses approximately 1,500 feet of wetland at the Dolores River hay meadow and the Dolores River crossing. In addition, the corridor crosses approximately 2.4 miles of rocky/shallow soils.

The corridor crosses Colorado State Highway (SH) 145 approximately 2.5 miles east of Dolores, Colorado. The corridor crosses approximately 0.8 mile of a very high visual constraint area where it crosses SH 145 and the Dolores River. The corridor also crosses approximately 0.8 mile of bald eagle winter range at the Dolores River and 0.2 mile of landslide area north of the Dolores River. Approximately 60 percent of the corridor crosses forest plan management category 7E, approximately 17 percent crosses 6B, and 23 percent crosses lands other than National Forest. Management area 7E emphasizes production and utilization of wood-fiber for sawtimber on gentle slopes. Management activities are not evident or remain visually

subordinate along primary roads and trails. Dispersed recreational opportunities are available. Management area 6B was described under the proposed route - Forest Road 514 potential utility corridor (see above).

Proposed Action - East. The Proposed Action - East potential utility corridor crosses the San Juan National Forest (approximately 9.1 miles) and intermixed private lands (approximately 15.7 miles) between MP 231.2P to MP 246.0P, and is located in Montezuma and La Plata Counties, Colorado. Land cover crossed by this corridor includes grassland/rangeland (28 percent), ponderosa pine (26 percent), conifer (22 percent), shrubland (19 percent), and stream/riparian (5 percent). The corridor crosses approximately 80 feet of wetlands at Chicken Creek, approximately 250 feet at the West Mancos River, approximately 80 feet at the Middle Mancos River, and approximately 50 feet at the East Mancos River. The corridor crosses approximately 2.2 miles of landslide areas and approximately 1.3 miles of Mexican spotted owl range. In addition, the corridor crosses approximately 4.7 miles of rocky/shallow soils.

According to the San Juan National Forest Land and Resource Management Plan (1983), the corridor crosses management categories 2A (2 percent), 4B (10 percent), 5B (25 percent), 6B (11 percent), and 7E (13 percent). The corridor also crosses approximately 5.2 miles (35 percent) of lands other than National Forest. Management areas 4B, 5B, 6B, and 7E were described above. The corridor crosses approximately 0.3 mile of management category 2A. Management area 2A emphasizes semi-primitive motorized recreational opportunities, such as snowmobiling, four-wheel driving, and motorcycling both on and off roads and trails in a naturally appearing environment. Management activities are visually subordinate. Forested lands in portions of the area are not suitable for timber production. Finally, the corridor crosses approximately 8.1 miles of very high or high visual constraint areas.

TransColorado Draft EIS - Agency Preferred Alternative

Agency Preferred Alternative - San Miguel Variation. The San Miguel potential utility corridor crosses the Uncompahgre National Forest for approximately 1.2 miles (MP 171.2A to MP 172.4A) and is located in San Miguel County, Colorado. Land cover crossed includes shrubland (42 percent), ponderosa pine (33 percent), and grassland/rangeland (25 percent). The corridor crosses approximately 15 feet of wetlands at the crossing of Brewster Creek. In addition, the corridor crosses 1.2 miles of rocky/shallow soils.

According to the Uncompahgre National Forest Land and Resource Management Plan (1987), the corridor crosses forest plan management areas 6B (42 percent) and 7E (42 percent). Approximately 16 percent of the corridor crosses lands other than National Forest. Management area 6B emphasizes livestock grazing. Semi-primitive non-motorized, semi-primitive motorized, and roaded natural recreational opportunities are provided. Management area 7E emphasizes wood fiber production and utilization on suitable timber land on slopes less than 40 percent.

The entire corridor is within a very high visual constraint area and is also classified as bald eagle winter range. Finally, there are no known geologic hazards within the corridor.

TransColorado Draft EIS - Variations

Mancos Valley East Variation. The Mancos Valley East variation potential utility corridor crosses the San Juan National Forest and some lands other than National Forest for approximately 24.0 miles (MP 0.0V to MP 24.0V), and is located in Montezuma and La Plata Counties, Colorado. This potential pipeline utility corridor is now designated as a utility corridor for powerlines.

Land cover crossed includes conifer forest (45 percent), shrubland (33 percent), ponderosa pine (7 percent), grassland/rangeland (5 percent), and stream/riparian (4 percent). The corridor crosses a total of approximately 1,150 feet of wetlands. In addition, the corridor crosses approximately 9.9 miles of rocky/shallow soils. Geologic hazards crossed by the corridor include approximately 3.8 miles of landslide areas and approximately 2.3 miles of the Jurassic Morrison formation (Class I Paleontological Resource area).

According to the San Juan National Forest Land and Resource Management Plan (1983), approximately 44 percent of the corridor crosses management category 6B, 16 percent crosses 7E, 8 percent crosses 2A, 8 percent crosses 5B, 8 percent crosses 4B, 3 percent crosses 2B, and 13 percent crosses lands other than National Forest. Management areas 2A, 4B, 5B, 6B, and 7E were previously described. Management area 2B emphasizes rural and roaded natural recreational opportunities, such as driving for pleasure, viewing scenery, and picnicking along sensitive travel routes while enhancing or maintaining scenic qualities inherent in a forest environment. Forested land is suitable for timber production. Approximately 9.2 miles (38 percent) of the corridor cross very high or high visual constraint areas. Finally, the corridor crosses approximately 1.1 miles of bald eagle winter range and 2.1 miles of Mexican spotted owl range.

Environmental Consequences

Impacts were identified based on an examination of each route being suitable for a utility corridor for four pipelines (Forest Service's Proposed Action). Acreage calculations were based on four pipelines similar to TransColorado's 22-inch pipeline in an average 250-foot-wide utility corridor. It is assumed that future pipelines to be placed in the potential utility corridors will use the same construction techniques and environmental protection measures agreed to by TransColorado. The impact analysis focused on the types of changes that will remain after all environmental protection measures are applied.

Environmental evaluation factors used in this analysis focused on topography (side slope and ascent/descent slope angles), geologic hazards, visual constraints, land use, land management, and natural resources (e.g., land cover, soils, wildlife, wetlands, and threatened or endangered species).

Topography

The width of the construction right-of-way (ROW) must be increased as the angle of the slope perpendicular to the route of the pipeline increases in steepness. The primary construction goal is to maintain the ROW as level as possible with respect to the slope. As side slopes steepen, more cut and fill are required to maintain a level work space for trenching and pipe laying equipment. If additional pipelines are constructed next to an existing line, each pipeline must

have a level work space. If the adjacent side slope increases in steepness, each successive pipeline requires more cut and fill to achieve the required construction work space width. For the purposes of this analysis, side slopes of 6 percent or less are considered to be routine construction (i.e., a standard 75-foot construction ROW width can be achieved under most conditions); side slopes in excess of 6 percent require non-routine construction (e.g., cut and fill, and benching) and additional mitigation measures. If all ROW cut-and-fill slopes are recontoured upon completion of pipeline installation, rock fragments are reincorporated into the trench, and/or waste rock is disposed of at an approved off-site location, then no long-term changes in side-slope topography would result from construction.

Pipelines can be constructed up the face of extremely steep slopes. However, the abilities of equipment to trench and transport loads becomes increasingly impaired as the slope angle steepens. Under very steep conditions, equipment must be supported by cables from above to maintain a proper working position. For the purposes of this analysis, ascent/descent slopes of 40 percent or less are considered to be routine construction. On slopes steeper than 40 percent, the complexity of laying pipeline substantially increases. The requirements for stabilization of the ROW to prevent soil erosion are also more extensive. Requirements for special slope stabilization will demand additional, site-specific studies. Long-term topographic impacts would occur where special slope stabilization measures are required beyond normal soil protection measures (e.g., benching, rip rap).

Geologic Hazards

Landslide zones, commonly associated with steep slopes and saturated soils, occur intermittently throughout the region traversed by the proposed and alternate routes. Site-specific studies should be conducted in landslide zones to determine whether special slope stabilization measures, stronger pipe, more frequent monitoring, or re-routing would be necessary to reduce the risk of slope failure damage to pipelines within the utility corridor. As already described, non-routine physical slope stabilization measures are considered a long-term change; the extent of these impacts would not be known until site-specific studies are completed.

Visual

The Forest Service's landscape management concept, as defined and implemented through the Visual Management System, must be considered for any linear facility that requires ground clearing and aboveground facilities. The Visual Quality Objective (VQO) designations are the baseline standards against which proposed landscape modifications are judged and impact levels established.

The visual analysis identified areas of low, moderate, high, and very high constraint. This was accomplished by comparing the visual contrast ratings (high, moderate, or low) to VQO designations. Areas of high constraint were identified as those areas where high or moderate visual contrast ratings occurred within a Retention area, and where high visual contrast occurred within a Partial Retention area.

This analysis was further refined to include a very high constraint area. All Retention areas were automatically included because of the limitations on visual modification within this zone. It is not reasonable to assume that any combination of mitigation measures, however exceptional, would be able to reduce visual impacts of such a broad utility corridor to acceptable levels in a

Retention area visible from sensitive viewpoints. Partial Retention areas with high visibility and little ability to adjust location to minimize visibility were also given a rating of very high because of the doubtful ability to reduce impacts of this magnitude to acceptable levels. Where high constraint areas were shown to occur within Partial Retention areas that may offer opportunities for relocations that would minimize visibility, the high rating was left as is. It should be recognized, however, that a relocation that minimizes impacts as seen from one area may prove more visible from another. Visibility considerations, as well as other resource values, would have to be taken into account before assuming a suitable adjustment in alignment could be accomplished. Areas of very high and high constraint crossed by the potential utility corridor that cannot be avoided or mitigated through other means represent long-term impacts.

Land Management/Land Use

Management prescription 1D provides for utility corridors (see Attachment 1). The management emphasis is for major oil and gas pipelines, major water transmission and slurry pipelines, electrical transmission lines, and transcontinental telephone lines. Management prescription 1D states that certain designated areas (e.g., wilderness, research natural areas, wild and scenic rivers) must be avoided; other special management areas should not be crossed unless mitigation measures are available. Potential impacts to recreation resources and/or transportation, other than potential visual impacts discussed above, were considered to be minor and short-term. An unavoidable adverse impact would result if the designation of a utility corridor were incompatible with the management goals of the management areas through which the corridor passes.

Natural Resources

Natural resources, such as land cover, soils, wildlife, wetlands, and threatened or endangered species, represent constraints that can generally be mitigated as part of project planning. However, there may be opportunities to reduce impacts to these resources by avoidance, seasonal restrictions, and rehabilitation. The clearing of forested lands and riparian/wetland vegetation is considered a long-term, unavoidable adverse impact. Construction impacts to bald eagles and Mexican spotted owls could include disturbance of nests resulting in nest abandonment and death of young birds. This would be a long-term impact because of the rarity of these nesting species. However, potential impacts to nesting bald eagles would be eliminated by prohibiting construction activities within 0.5 mile of any nesting area between April 15 and August 15. Potential impacts to Mexican spotted owls would be reduced by conducting nesting surveys of potential habitat prior to construction. To prevent potential impacts to the black-footed ferret, all prairie dog towns of sufficient size (according to U.S. Fish and Wildlife Service guidelines) would be surveyed for black-footed ferrets prior to construction.

Impacts

Table A-1 quantifies impacts as identified by the pipeline utility corridor analysis on Forest Service lands.

Summary and Future Actions

The question of whether a new corridor is needed in the Mancos Valley will be addressed concurrently with the TransColorado Gas Transmission Project EIS process. This analysis

addresses the question of the suitability of each analyzed route for a new utility corridor occupied by four pipelines, if it is shown that the route is needed for the selected route in the TransColorado project.

The data and information gathered to date for this utility corridor analysis display the impacts that might occur from a four-pipeline utility corridor on the analyzed routes and raise some questions about limiting factors that need further field investigation. These potential limiting factors appear to limit the use of the Proposed Action - Ryman Creek, the Proposed Action - East, and the Mancos Valley East Variation routes as new utility corridors. Further field investigations will be done this summer on the above-mentioned routes on landslide areas, slope instability areas, areas appearing to be constrained for four pipelines, and areas where visual impacts preclude meeting management objectives.

When the field work is completed and documented, a suitability determination will be made for each route. If any of the routes determined to be suitable for a utility corridor are selected for the final TransColorado project route, a forest plan amendment will designate the route as a utility corridor on a forest plan map and apply Management Area Prescription 1D to it (see Figures A-1, A-2, and A-3 and Attachment No. 1).

TABLE A-1

Summary Impact Comparisons of the TransColorado Pipeline Corridor Analyses on Forest Service Lands

Relation to TransColorado Draft EIS	Proposed Action				Agency Preferred Alternative	Route Variations
Potential Utility Corridor Routes	**Proposed Action Ryman Creek (MP 187.4 - MP 195.1) San Juan National Forest**	**Proposed Action Forest Road (MP 203.2 - MP 207.1) San Juan National Forest**	**Proposed Action (West) (MP 219.6 - MP 222.6) San Juan National Forest**	**Proposed Action (East) (MP 231.2 - MP 246.0) San Juan National Forest**	**Agency Preferred Alternative/ San Miguel Variation (MP 171.3 - MP 172.5) Uncompahgre National Forest**	**Mancos Valley East Variation (MP 0.0 - MP 24.0) San Juan National Forest**
Forest Plan Category Change[1] (miles/acres)	This route crosses the following USFS management area: 4B - 0.4 mile 121 acres 5B - 5.4 miles 164 acres	This route crosses the following USFS management area: 6B - 3.9 miles 118 acres	This route crosses the following USFS management areas: 8B - 0.5 mile 15 acres 7E - 1.8 miles 55 acres	This route crosses the following USFS management areas: 2A - 0.3 mile 9 acres 4B - 1.5 miles 46 acres 5B - 3.7 miles 112 acres 6B - 1.7 miles 52 acres 7E - 1.9 miles 58 acres	This route crosses the following USFS management areas: 6B - 0.5 mile 15 acres 7E - 0.5 mile 15 acres	This route crosses the following USFS management areas: 2A - 2.0 miles 61 acres 2B - 0.6 mile 18 acres 4B - 1.8 miles 55 acres 5B - 2.0 miles 61 acres 6B - 10.6 miles 321 acres 7E - 3.8 miles 115 acres
Climate	Since there would be no change in operational CO_2 emissions from operation of this route segment, impact comparisons are not applicable.	Since there would be no change in operational CO_2 emissions from operation of this route segment, impact comparisons are not applicable.	Since there would be no change in operational CO_2 emissions from operation of this route segment, impact comparisons are not applicable.	Since there would be no change in operational CO_2 emissions from operation of this route segment, impact comparisons are not applicable.	Since there would be no change in operational CO_2 emissions from operation of this route segment, impact comparisons are not applicable.	Since there would be no change in operational CO_2 emissions from operation of this route segment, impact comparisons are not applicable.
Air Quality	Fuel combustion by each pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for each pipeline an estimated 5 construction days.	Fuel combustion by each pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for each pipeline an estimated 3 construction days.	Fuel combustion by each pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for each pipeline an estimated 2 construction days.	Fuel combustion by each pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for each pipeline an estimated 11 construction days.	Fuel combustion by each pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for each pipeline an estimated 1 construction days.	Fuel combustion by each pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for each pipeline an estimated 17 construction days.

TABLE A-1 (Continued)

Relation to TransColorado Draft EIS	Proposed Action				Agency Preferred Alternative	Route Variations
Topography	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on 12 acres for the long term (greater than 50 years). the corridor would disturb 62 acres of slopes less than 6 percent, 92 acres of slopes between 15 and 6 percent and 50 acres on slopes between 15 and 40 percent.	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years). the corridor would disturb 34 acres of slopes less than 6 percent, 35 acres of slopes between 6 and 15 percent and 13 acres of slopes between 15 and 40 percent.	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years). the corridor would disturb 7 acres of slopes less than 6 percent, 34 acres of slopes between 6 and 15 percent, and 5 acres between 15 and 40 percent.	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years). The corridor would disturb 93 acres of slopes less than 6 percent, 173 acres of slopes between 6 and 15 percent, and 29 acres of slopes between 15 and 40 percent.	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years). The corridor would disturb 36 acres of slopes less than 6 percent.	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on 18 acres for the long term (greater than 50 years). Cut-and-fill actions on side slopes greater than 40 percent would be required only where topographic constraints limit other route options. These slope alterations represent less than 1 percent of the construction ROW area. The corridor would disturb 258 acres of slopes less than 6 percent, 230 acres of slopes between 6 and 15 percent, and 61 acres of slopes between 15 and 40 percent.
Leasable Minerals	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.
Mineral Materials	No direct corridor ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct corridor ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct corridor ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct corridor ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct corridor ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct corridor ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.
Water Quality	No major rivers, major streams, or minor perennial streams are crossed.	Trenching, pipe-laying, and backfilling in 1 minor perennial stream would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.	No major rivers, major streams, or minor perennial streams are crossed.	Trenching, pipe-laying, and backfilling in 2 major streams and 2 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.	No major rivers, major streams, or minor perennial streams are crossed.	Trenching, pipe-laying, and backfilling in 1 major river, 3 major streams and 3 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.
Municipal Water Supplies	Construction of the pipeline would not cross a water supply stream.	Construction of the pipeline would not cross a water supply stream.	Construction of the pipeline would not cross a water supply stream.	Construction of the pipeline would not cross a water supply stream.	Construction of the pipeline would not cross a water supply stream.	Construction of the pipeline would not cross a water supply stream..

TABLE A-1 (Continued)

Relation to TransColorado Draft EIS	Proposed Action				Agency Preferred Alternative	Route Variations
Wetlands	Pipeline construction would decrease available wetland areas by disturbing .01 acre of forested wetlands. The disturbance of forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 4.5 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing 0.9 acre of forested wetlands. The disturbance of forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 1.6 acres of wetland soils disturbed by construction.	Pipeline construction would not decrease available wetland areas.	Pipeline construction would decrease available wetland areas by disturbing 2.6 acre of forested wetlands. The disturbance of forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 4 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing 0.9 acres of forested wetlands. The disturbance of forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 4.5 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing 0.3 acre of wet meadows/haylands and 6 acres forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 2.1 acres of wetland soils disturbed by construction.
Soils	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 231 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (30 acres), or rocky shallow soils (15 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 117 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (0 acre), or rocky shallow soils (0 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 90 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (21 acres), or rocky shallow soils (90 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 444 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (54 acres), or rocky shallow soils (180 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 36 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (0 acres), or rocky shallow soils (36 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 720 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (111 acres), or rocky shallow soils (270 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.
Forestry	Clearing the ROW would decrease forestry resources by approximately 0 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of 51 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 6 acres of timber resources (Douglas fir, ponderosa pine, aspen) and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 48 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 249 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 15 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 270 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.

TABLE A-1 (Continued)

Relation to TransColorado Draft EIS	Proposed Action				Agency Preferred Alternative	Route Variations
Livestock	Clearing the ROW would decrease available grazing land by approximately 2.3 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 11.8 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 9 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 44.8 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 3.6 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 64.8 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.
Wildlife	ROW clearing would result in vegetation decreases in 189 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing would result in decreases of 6 acres of key mule deer habitat. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species.	ROW clearing would result in vegetation losses for 90 acres of key mule deer range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing would result in vegetation decreases in 194 acres of elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing would not impact key mule deer range, key elk range, key antelope range, or sage grouse breeding/nesting range.	ROW clearing for this alternative would not result in vegetation losses for key mule deer range, key elk range, key antelope range, or sage grouse breeding/ nesting range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.
Fisheries	No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 1 minor perennial stream. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 2 major streams and 2 minor perennial streams. All 4 are classified as Class 1 coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 1 major river, 1 major streams, and 4 minor perennial streams. Of these, 5 are classified as Class 1 coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.

TABLE A-1 (Continued)

Relation to TransColorado Draft EIS	Proposed Action				Agency Preferred Alternative	Route Variations
Cultural Resources	The proposed route would traverse 7.7 miles of high-sensitivity areas and 0 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	The proposed route would traverse 1.6 miles of high-sensitivity areas and 1.9 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	The proposed route would traverse 0.15 mile of high-sensitivity areas and 2.4 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	The proposed route would traverse 11.3 miles of high-sensitivity areas and 2.7 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	The proposed route would traverse 0.4 mile of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	The proposed route would traverse 4 miles of high-sensitivity areas and 20 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.
Visual Resources	There would be no high, short-and long-term visual impacts along the ROW.	There would be no high, short-and long-term visual impacts along the ROW.	There would be no high, short-and long-term visual impacts along the ROW.	Approximately 0.7 miles of high, short-and long-term visual impacts along the ROW would be unavoidable adverse impacts that would exceed the visual management objectives for these areas.	There would be no high, short-and long-term visual impacts along the ROW.	Approximately 0.3 miles of high, short-and long-term visual impacts along the ROW would exceed the visual management objectives for these areas.
Transportation	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of approximately 8.5 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of approximately 4 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would not require the improvement or grading of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of approximately 7.5 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would not require grading of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 25.5 miles of dirt/gravel road.
Solid Hazardous Waste	An estimated 109 cubic yards of construction related solid waste would be generated for each pipeline and disposed of in currently operating landfills along the pipeline route.	An estimated 55 cubic yards of construction related solid waste would be generated for each pipeline and disposed of in currently operating landfills along the pipeline route.	An estimated 43 cubic yards of construction related solid waste would be generated for each pipeline and disposed of in currently operating landfills along the pipeline route.	An estimated 210 cubic yards of construction related solid waste would be generated for each pipeline and disposed of in currently operating landfills along the pipeline route.	An estimated 17 cubic yards of construction related solid waste would be generated for each pipeline and disposed of in currently operating landfills along the pipeline route.	An estimated 340 cubic yards of construction related solid waste would be generated for each pipeline and disposed of in currently operating landfills along the pipeline route.
Socioeconomic Conditions	The proposed route would require 7.7 miles of National Forest land to be designated as a new multiple utility corridor.	The proposed route would require 3.9 miles of National Forest land to be designated as a new multiple utility corridor.	The proposed route would require 3 miles of National Forest land to be designated as a new multiple utility corridor.	The proposed route would require 14.8 miles of National Forest land to be designated as a new multiple utility corridor.	The proposed route would require 1.2 miles of National Forest land to be designated as a new multiple utility corridor.	The proposed route would require 21.6 miles of National Forest land to be designated as a new multiple utility corridor.

[1]Noted existing management areas would change to management area 1D.

ATTACHMENT NO.1

MANAGEMENT PRESCRIPTION 1D

(Provides for utility corridors.)

Management emphasis is for major oil and gas pipelines, major water transmission and slurry pipelines, electrical transmission lines, and transcontinental telephone lines. Management activities within these linear corridors strive to be compatible with the management goals of the management areas through which they pass. Utility corridors are not permitted in wilderness unless authorized by the President. They also are not capatible with Research Natural Areas or Wild and Scenic Rivers. They will avoid developed recreation sites and winter sports sites (Management Areas 1A and 1B); Management Area 3B which emphasizes primitive recreation in unroaded areas; Riparian Areas (Management Area 9A); Experimental forests (Management Area 10B); Special Interest Areas (Management Area 10C); and Municipal Water Supply and Municipal Watersheds (Management Area 10E) unless studies indicate that the impact of the corridor can be mitigated.

B. MANAGEMENT REQUIREMENTS

MANAGEMENT ACTIVITIES	GENERAL DIRECTION	STANDARDS & GUIDELINES
Visual Resource Management (A04)	01 Design and construct utilities to harmonize with the landscape. (0295) (1D)	a. Use "National Forest Landscape Management", Volume 2-Utilities for principles and concepts. (6153) (1D)
	02 Manage for adopted VQO. (20220M) (1D)	
	03 Implement visual resource management, as outlined in the Forest Management Requirements. (20230M) (1D)	
Dispersed Recreation Management (A14 and 15)	01 Manage dispersed recreation opportunities consistent or compatible with adjacent management areas. (0297) (1D)	
Wildlife Habitat Improvement and Maintenance (C02, 04, 05 and 06)	01 Manage wildlife and fish habitat consistent or compatible with adjacent management areas. (0296) (1D)	
Range Resource Management (D02)	01 Manage the range resource consistent or compatible with adjacent management areas. (0298) (1D)	
Silvicultural Prescriptions (E03, 06 & 07)	01 Manage forest cover types consistent or compatible with adjacent management areas. Provide required electrical clearances and minimize the visual impact of the utility right-of-way. (0299) (1D)	
	02 Utilize firewood material using both commercial and noncommercial methods. (0147) (1D)	
Special Use Management (Non -Recreation) (J01)	01 Transportation and utility corridors must be compatible with the Management Area goals thorugh which they pass. (21620M) (1D)	a. Corridors shall be designed using the definitions and process established in FSM 1922.51. (81600M) (1D)

MANAGEMENT ACTIVITIES	GENERAL DIRECTION	STANDARDS & GUIDELINES
Rights-of-way and Land Adjustments (J02, 13, 15, 16, 17, and 18)	01 Design, construct and maintain electrical transmission lines in accordance with the rules of the National Electrical Safety Code, ANSI. Unless otherwise indicated on the plan and profile drawings, all construction and clearances of the transmission line shall conform to the latest edition of the National Electrical Safety Code, ANSI issued by the American National Standards Institute. (0473) (1D) 02 All design, materials and construction, operation, maintenance and termination practices employed in connection with oil pipelines shall be in accordance with safe and proven engineering practices and shall meet or exceed the following: a. U.S.A. Standard Code for Pressure Piping, ANSI B 31.4, "Liquid Petroleum Transportation system." b. Department of Transportation Regulations, 49 CFR, Part 195, "Transportation of Liquids by Pipeline". (0474) (1D) 03 All design, materials and construction, operation, maintenance and termination practices employed in connection with gas piplines shall be in accordance with safe and proven engineering practices and shall meet or exceed the following: a Department of Transportation Regulations, ASME Gas Piping Standards Committee, "Guide for Gas Transmission and Distrubution Piping System" (3rd Edition, April 1976). b. 49 CFR, Part 192, "Transportation of Natural and other Gas by Pipelines: Minimum Federal Safety Standards." (0475) (1D)	
Fire Planning and Suppression (P01)	01 Provide a level of protection from wildlife that is cost efficient and that will meet management objectives for the area. (2223GM) (1D)	a. Prompt control of all wildfires. (8220QM) (1D)

MANAGEMENT ACTIVITIES	GENERAL DIRECTION	STANDARDS & GUIDELINES
Fuel Treatment (P11 thru 14)	01 Maintain fuel conditions which permit fire suppression forces to meet fire protection objectives for the area. (0113) (1D)	a. Reduce or otherwise treat all fuels so the potential fire-line intensity will not exceed 100 BTU's/sec/ft (BI38) on 90% of the days during the regular fire season. (82240M) (1D)

PRESCRIPTION FOR MANAGEMENT AREA 1D

(Provides for utility corridors.)

MANAGEMENT PRESCRIPTION SUMMARY

General Description and Goals:

Management emphasis is for major oil and gas pipelines, major water transmission and slurry pipelines, electrical transmission lines, and transcontinental telephone lines. Management activities within these linear corridors strive to be compatible with the management goals of the management areas through which they pass.

B. MANAGEMENT REQUIREMENTS

MANAGEMENT ACTIVITIES	GENERAL DIRECTION	STANDARDS & GUIDELINES
Diversity on National Forests and National Grasslands (A00)	01 Require right-of-way clearing and revegetation consistent or compatible with diversity objectives of adjacent management areas. (0038SJ) (01D)	
Visual Resource Management (A04)	01 Design and construct utilities to harmonize with the landscape. (0295) (01D)	a. Use "National Forest Landscape Management", Volume 2-Utilities for principles and concepts. (6153) (01D)
Dispersed Recreation Management (A14 and 15)	01 Manage dispersed recreation opportunities consistent or compatible with adjacent management areas. (0297) (01D)	
Wildlife Habitat Improvement and Maintenance (G02, 04, 05 and 06)	01 Manage wildlife and fish habitat consistent or compatible with adjacent management areas. (0296) (01D)	a. Limit right-of-way clearing width to a maximum of 600 feet to prevent adverse effects on wildlife. (7254SJ) (01D)
Range Resource Management (D02)	01 Manage the range resource consistent or compatible with adjacent management areas. (0298) (01D)	
Silvicultural Prescriptions (E03, 06 & 07)	01 Manage forest cover types consistent or compatible with adjacent management areas. Provide required electrical clearances and minimize the visual impact of the utility right-of-way. (0299) (01D) 02 Utilize firewood material using both commercial and noncommercial methods. (0147) (01D)	

MANAGEMENT ACTIVITIES	GENERAL DIRECTION	STANDARDS & GUIDELINES

Rights-of-way and Land Adjustments (J02, 13, 15, 16, 17, and 18)

01 Design, construct and maintain electrical transmission lines in accordance with the rules of the National Electrical Safety Code, ANSI. Unless otherwise indicated on the plan and profile drawings, all construction and clearances of the transmission line shall conform to the latest edition of the National Electrical Safety Code, ANSI issued by the American National Standards Institute.
(0473) (01D)

02 All design, materials and construction, operation, maintenance and termination practices employed in connection with oil pipelines shall be in accordance with safe and proven engineering practices and shall meet or exceed the following:

a. U.S.A. Standard Code for Pressure Piping, ANSI B 31.4, "Liquid Petroleum Transportation system."

b. Department of Transportation Regulations, 49 CFR, Part 195, "Transportation of Liquids by Pipeline".
(0474) (01D)

03 All design, materials and construction, operation, maintenance and termination practices employed in connection with gas piplines shall be in accordance with safe and proven engineering practices and shall meet or exceed the following:

a. Department of Transportation Regulations, ASME Gas Piping Standards Committee, "Guide for Gas Transmission and Distrubution Piping System" (3rd Edition, April 1976).

b. 49 CFR, Part 192, "Transportation of Natural and other Gas by Pipelines: Minimum Federal Safety Standards."
(0475) (01D)

MANAGEMENT ACTIVITIES	GENERAL DIRECTION	STANDARDS & GUIDELINES
Transportation System Management (L01 & 20)	01 Manage the transportation system and travel off development roads and trails consistent or compatible with adjacent management areas. (4780SJ) (01D)	
Fire Planning and Suppression (P01)	01 Provide a level of protection from wildfire that is cost-efficient and that will meet objectives of adjacent management areas. (5033SJ) (01D)	

APPENDIX B

ROUTE VARIATIONS FOR THE TRANSCOLORADO PROPOSED ROUTE AND THE AGENCY PREFERRED ROUTE

APPENDIX B
ROUTE VARIATIONS FOR THE TRANSCOLORADO PROPOSED ROUTE OR THE AGENCY PREFERRED ROUTE

INTRODUCTION

As explained in Chapter 2, numerous pipeline routes have been studied in selecting a TransColorado proposed route and agency preferred route. Some routes have been eliminated from further consideration and others are still being considered as replacements to corresponding sections of the TransColorado proposed route or agency preferred route. These route replacements have been termed route variations.

There are three locations in which a route variation would replace a corresponding section of the TransColorado proposed route or agency preferred route. For purposes of discussion, these locations are termed Segments. Segment 1 is in the Grand Valley area. Segment 1 begins at a point near Roan Creek and ends at Whitewater. Segment 2 is in the Mancos Valley area. It begins at Stoner and ends at Mancos Hill. Segment 3 is in the Dolores area. It begins near Dolores and ends at Bloomfield, New Mexico.

The route variations being considered are described in this appendix. Although the TransColorado Proposed and agency preferred routes have tentatively been identified, no decision has been made regarding the final routing. Therefore, the impacts associated with construction of the route variations are also included in this appendix so that additional analysis will not be necessary should a decision be made to replace a section of the TransColorado proposed route or agency preferred route with a route variation.

The construction, operation, maintenance, and abandonment processes would be the same as those described in Chapter 2. The general protection measures described in Chapter 2 would also be employed by TransColorado should any of these routes be chosen as the approved route.

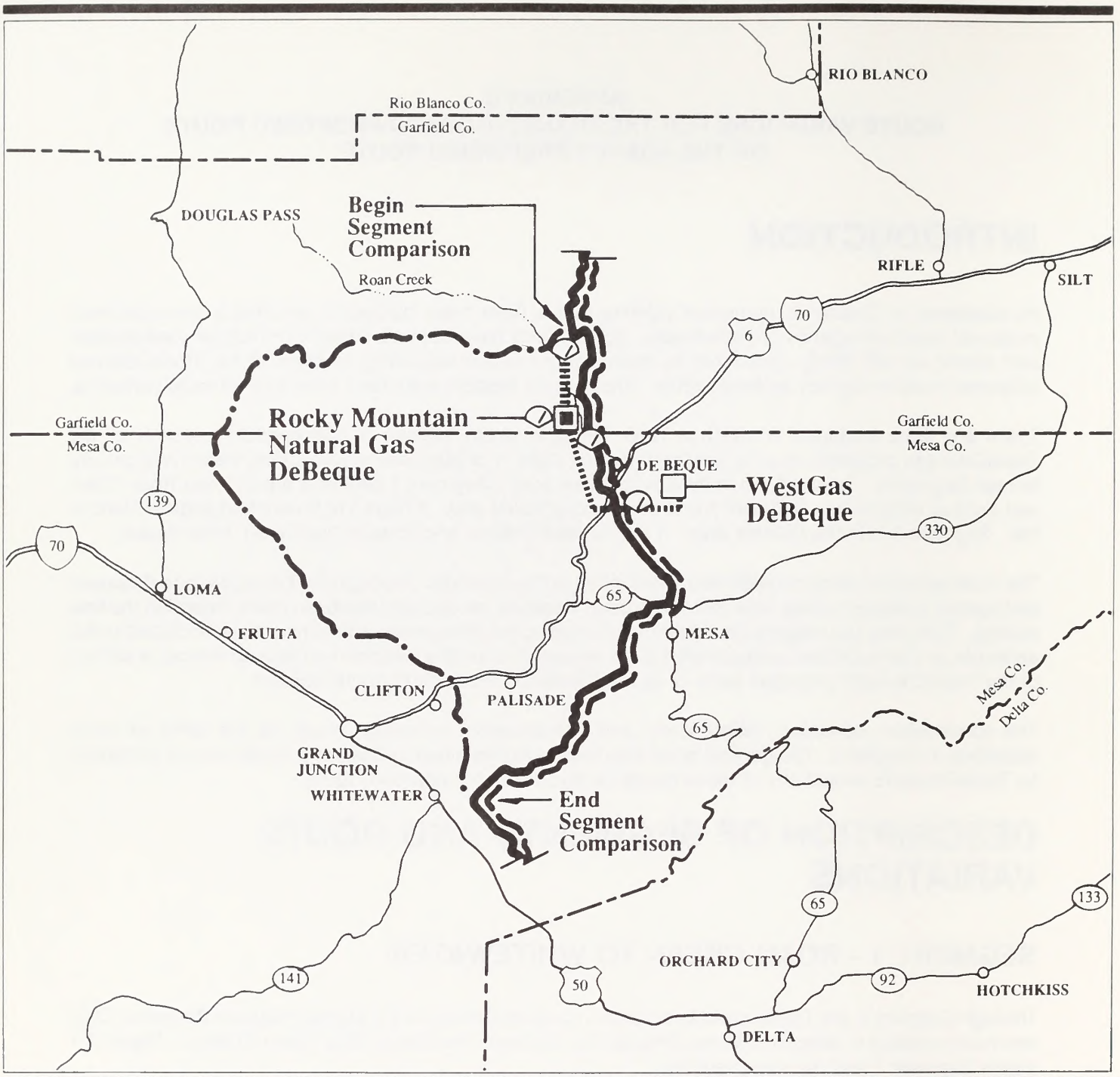
DESCRIPTION OF SEGMENTS AND ROUTE VARIATIONS

SEGMENT 1 - ROAN CREEK TO WHITEWATER

Through Segment 1, the TransColorado proposed route and the agency preferred route are the same. Only one route variation is being considered through this segment: the Grand Valley Route Variation. Figure B-1 shows Segment 1 and the route variation.

Grand Valley Route Variation

The Grand Valley Route Variation begins approximately 10 miles north of DeBeque (Milepost 32.2) and ends south of Whitewater (Milepost 83.3). The Grand Valley Route Variation is an alternative to crossing steep slopes on portions of the Grand Mesa and avoiding the Palisade and Grand Junction Municipal Watersheds. It also would avoid the Gilman Gulch and DeBeque areas. The Grand Valley Route Variation would require the construction of an additional 15.8 miles of 12-inch and 8-inch pipeline (Figure B-1) which would connect the DeBeque-WestGas meter station via the Rocky Mountain-DeBeque compressor station. Following is a comparison of the Grand Valley Route Variation and the TransColorado proposed route/agency preferred route.



Proposed Pipeline Route

Agency Preferred Route

Grand Valley Variation

12 Inch Interconnecting Pipeline

8 Inch Interconnecting Pipeline

Existing Compressor Station, Pipeline Interconnection and Meter Station

Proposed Compressor Station

Proposed Meter Station

SEGMENT #1 GRAND VALLEY VARIATION

FIGURE B-1

TRANSCOLORADO GAS TRANSMISSION PROJECT

Pipeline System Components. Table B-1 compares the land ownership and parallel facilities of the Grand Valley Route Variation to the corresponding segment of the TransColorado proposed route. the Grand Valley Route Variation would be 19 miles longer than the corresponding TransColorado proposed route. This segment would parallel at least one existing right-of-way for 32 miles compared to 30 miles paralleled by the corresponding segment of the TransColorado proposed route.

Natural Resource Requirements. The Grand Valley Route Variation would require 485 cubic yards of trench padding material in excess of that required for the corresponding TransColorado proposed route . There is one source of water for hydrostatic testing and dust control located on this segment compared to three on the corresponding TransColorado proposed route. Table B-2 compares the occurrence of natural resources crossed by the various routes.

Infrastructure Requirements. Infrastructure would be the same as that discussed for the TransColorado proposed route with the exception of access road needs. Approximately 30 miles of private and public roads would require upgrade for implementation of the Grand Valley Route Variation compared to approximately 33 miles of upgrade on the corresponding TransColorado proposed route.

SEGMENT 2 - STONER TO MANCOS

Segment 2 begins at Stoner and ends at Mancos Hill. Through Segment 2, the TransColorado proposed route and the agency preferred route are different (Figure B-2). Two-thirds of the TransColorado proposed route would be constructed in the San Juan National Forest, outside an existing utility corridor, bypassing much of the private land. The agency preferred route would be constructed mostly on private land in an existing corridor in the Mancos Valley area, bypassing most of the San Juan National Forest.

Through Segment 2 area there are two Route Variations that could replace a corresponding section of either the TransColorado proposed route or the agency preferred route: The Mancos East Route Variation and the Mancos Valley Central Route Variation (Figure B-3).

Mancos Valley East Route Variation

The Mancos Valley East Route Variation would replace the corresponding section of both the TransColorado proposed route and the agency preferred route (Figure B-3). The Mancos Valley East Route Variation would be constructed mostly on national forest system land.

Pipeline System Components. Implementation of the Mancos Valley East Route Variation would require that the Dolores Compressor Station Alternate Site 1 be constructed. Other Dolores compressor station sites are not feasible. This route variation is 10 miles shorter than the TransColorado proposed route and 7.0 miles shorter than the agency preferred route. This route variation parallels at least one other utility right-of-way for 21.6 miles compared to 9.3 under the TransColorado proposed route and 28.5 under the agency preferred route (Table B-3).

Natural Resource Requirements. The Mancos Valley East Route Variation would require 240 fewer cubic yards of trench padding material than would the TransColorado proposed route. This route variation would cross one water source as would the corresponding Transcolorado proposed route and agency preferred route. Table B-4 compares the occurrence of natural resources along the various routes.

TABLE B-1

Land Ownership and Parallel Facilities
Grand Valley Route Variation vs. TransColorado's Proposed Route

	TransColorado Proposed/Agency Preferred	Grand Valley Alternate
Length	51 miles	70 miles
Ownership-Private	59 percent	35 percent
Ownership - BLM	41 percent	65 percent
Total Disturbance	464 acres	636 acres
Parallel Facilities	30 miles	32 miles
Road Improvements	33 miles	30 miles
Existing Compressor Stations	1	0
Proposed Compressor Stations	1	1
Proposed Meter Stations	2	1
Proposed Block Valve	4	5

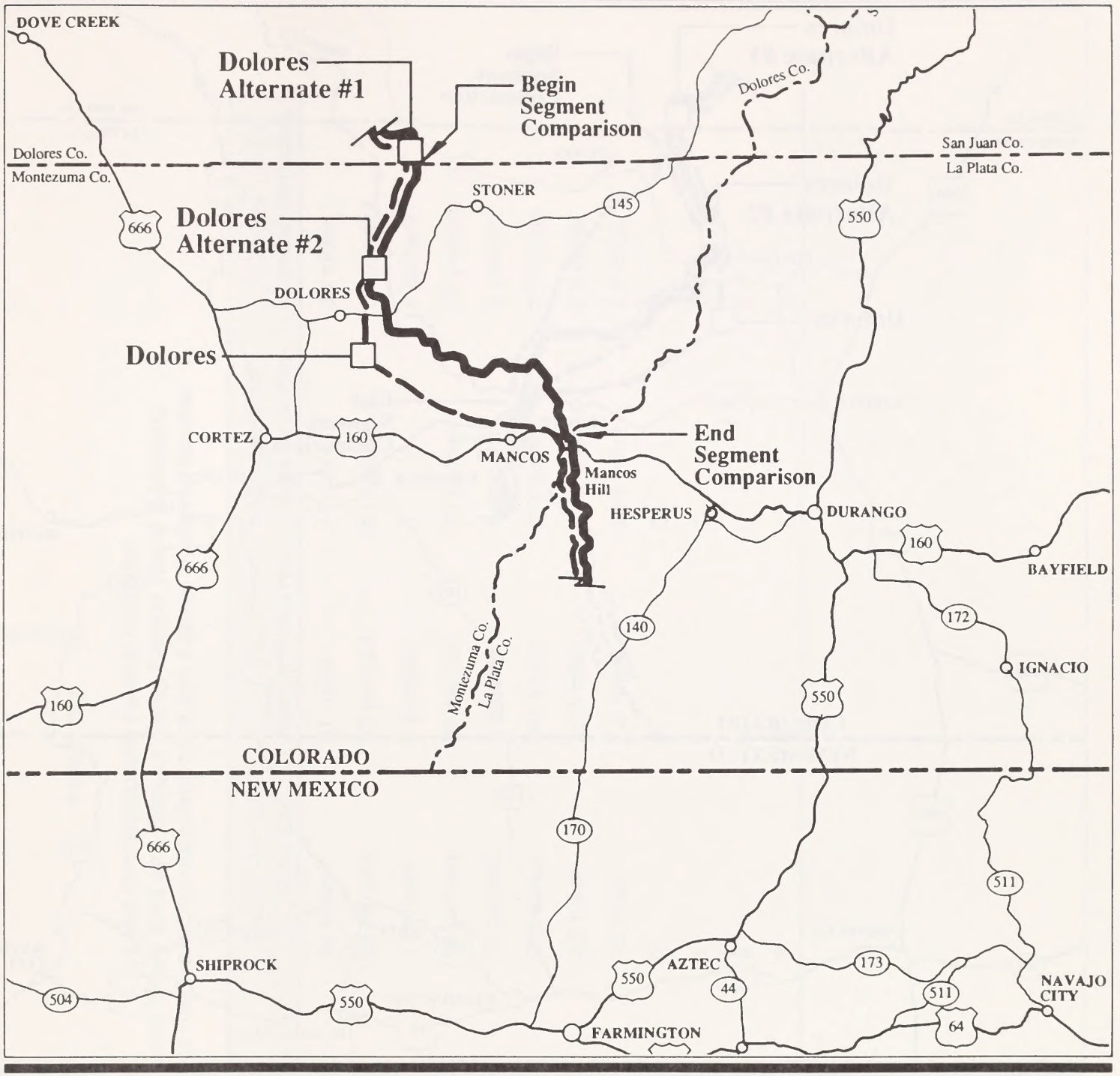
TABLE B-2

Occurrence of Natural Resources
Grand Valley Variation vs. TransColorado's Proposed Route

	TransColorado Proposed/Agency Preferred	Grand Valley Variation
Paleontological Formations	13 miles	4 miles
Oil and Gas Fields	9 miles	0
Coal Bed Methane	28 miles	15 miles
Coal Formations	28 miles	15 miles
Strippable Coal	0	0
Oil Shale (<25 gallons/ton)	0	18 miles
Oil Shale (>25 gallons/ton)	5 miles	2 miles
Major Rivers Crossed	1	1
Major Streams Crossed	2	0
Minor Streams Crossed	1	2
Wet Meadow/Hayland	.6	0
Forested Wetland	.02 mile	.2 mile
Shrubland Wetland	0.2 mile	.1 mile
Saline/Alkaline Soils	18.5 miles	49 miles
Rocky/Shallow/Wetland Soils	23 miles	48 miles
Steep Ascent/Descent Slopes >15 percent <40 percent	4.2 miles	1.3 miles
Steep Ascent/Descent Slopes ≥ 40 percent	2.4 miles	2.3 miles
Steep Side Slopes ≥ 40 percent	0	.6 mile
Active Landslides	1.7 miles	0
Landslide Areas	13 miles	1 mile
Incised Channels	9 miles	26 miles
Prime Farmlands	0 miles	3.1 miles
Farmland of Statewide Importance	7.8 miles	4.6 miles
Agricultural Lands	7.8 miles	8 miles
Rangeland	30.6 miles	59 miles

TABLE B-2 (CONTINUED)

	TransColorado Proposed/Agency Preferred	Grand Valley Variation
Timber Lands	1 mile	1 mile
Pinyon Juniper Woodlands	11.6 miles	2.1 miles
AUMs - Livestock	51 AUMs	70 AUMs
Key Deer Range	24.5 miles	17.5 miles
Key Elk Range	9 miles	19 miles
Key Grouse Range	4.7 miles	5.5 miles
Key Antelope Range	0	25 miles
Historical Raptor Nests	3 nests	10 nests
Bald Eagle Winter Range	3 miles	1 mile
Great Blue Heron Rookery	1 mile	0
Potential Black-Footed Ferret Habitat	0	31 miles
Threatened and Endangered Plant Habitat	25 miles	18 miles
Cultural Resources Projected Sites within 75-foot ROW	12	14
Cultural Resources High Sensitivity Areas	39 miles	21 miles
Cultural Resources Medium Sensitivity Areas	10 miles	23 miles
Visual Contrasts (High)	1.2 miles	5.8 miles
Visual Contrasts (Moderate)	6 miles	5 miles
Irrigation Ditches	5	10
Major Rail Crossings	1	1
Federal Highway Crossings	1	2
State Highway Crossings	1	0
Residences within 500 feet of ROW	5	49
Solid and Hazardous Waste	720 (cubic yards)	1,000 (cubic yards)



Proposed Pipeline Route

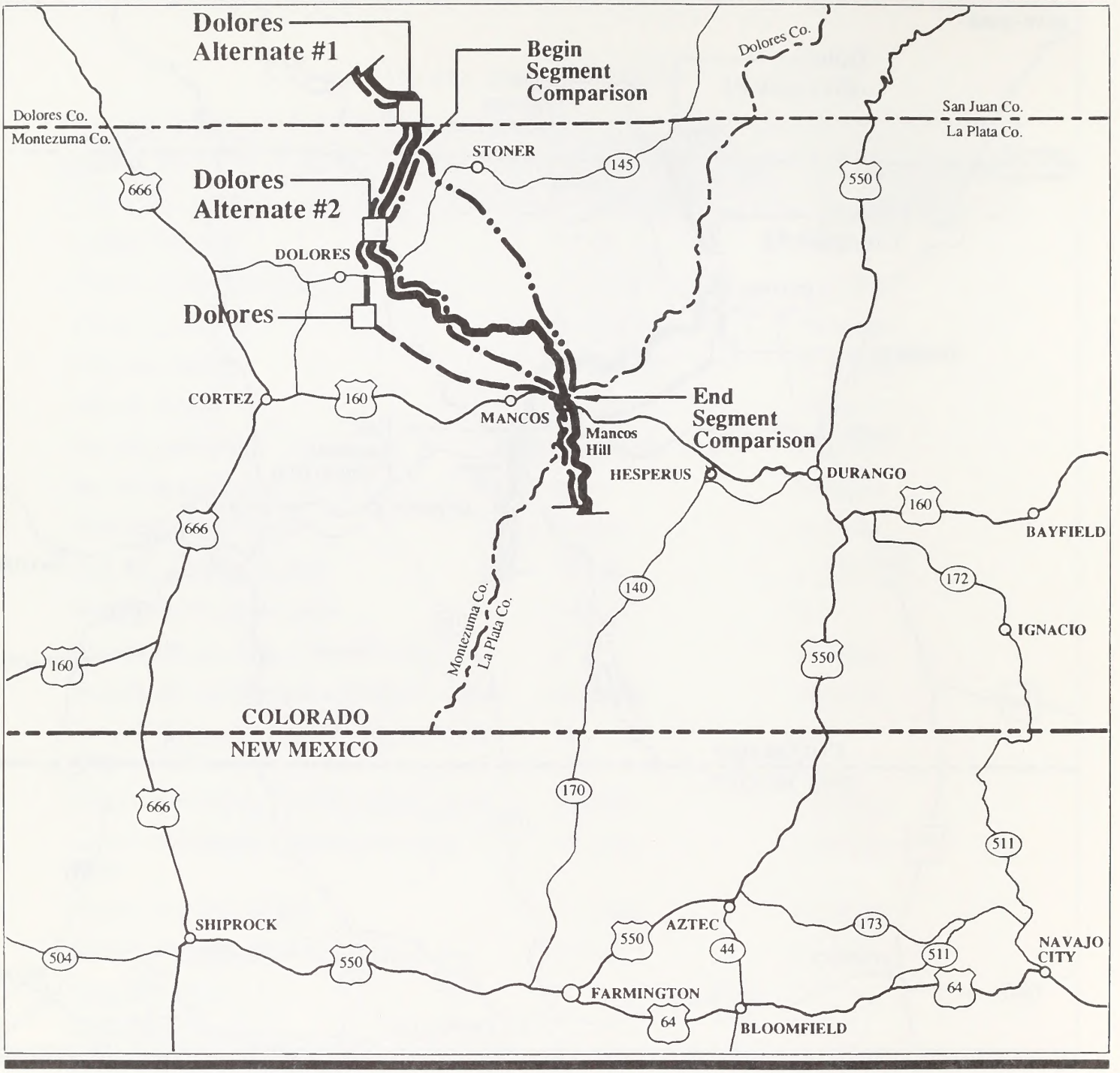
Agency Preferred Route

Proposed Compressor Station

SEGMENT #2 TRANSCOLORADO PROPOSED ROUTE & AGENCY PREFERRED ROUTE (MANCOS VALLEY)

FIGURE B-2

TRANSCOLORADO GAS TRANSMISSION PROJECT



Proposed Pipeline Route

Agency Preferred Route

Mancos Valley East Variation

Mancos Valley Central Variation

Proposed Compressor Station

SEGMENT #2 MANCOS VALLEY VARIATIONS

FIGURE B-3

TRANSCOLORADO GAS TRANSMISSION PROJECT

TABLE B-3

Land Ownership and Parallel Facilities
Mancos Valley East and Mancos Valley Central Route Variations
versus the TransColorado Proposed and Agency Preferred Routes

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Length	34 miles	31 miles	24 miles	30 miles
Ownership-Private	29 percent	53 percent	6 percent	50 percent
Ownership - BLM	1 percent	6 percent	0	2 percent
Ownership - National Forest	59 percent	36 percent	90 percent	43 percent
Ownership - State	11 percent	5 percent	4 percent	5 percent
Total Disturbance	309 acres	281 acres	218 acres	273 acres
Parallel Facilities	9.3 miles	28.5 miles	21.6 miles	9.3 miles
Road Improvements	15 miles	7.7 miles	25.5 miles	8.5 miles
Existing Compressor Stations	0	0	0	0
Proposed Compressor Stations	1	1	1	1
Proposed Meter Stations	0	0	0	0
Proposed Block Valve	2	2	2	2

TABLE B-4

Occurrence of Natural Resources
Mancos Valley East and Mancos Valley Central Route Variations
versus the TransColorado Proposed and Agency Preferred Routes

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Paleontological Formations	1 mile	0.5 mile	1.8 miles	0.8 miles
Oil and Gas Fields	0	0	0	0
Coal Bed Methane	0	0	0	0
Coal Formations	29 miles	24 miles	16 miles	24 miles
Strippable Coal	0	3	0	0
Oil Shale (<25 gallons/ton)	0	0	0	0
Oil Shale (>25 gallons/ton)	0	0	0	0
Major Rivers Crossed	1	1	1	1
Major Streams Crossed	2	1	3	1
Minor Streams Crossed	3	2	5	5
Wet Meadow/Hayland	.3 mile	.05 mile	.01 mile	.3 mile
Forested Wetland	.13 mile	.08 mile	.2 mile	.09 mile
Shrubland Wetland	.07 mile	.06 mile	0	.07 mile
Saline/Alkaline Soils	0	0	0	0
Rocky/Shallow/Wetland Soils	18 miles	19 miles	9 miles	16 miles
Steep Ascent/Descent Slopes >15 percent <40 percent	1.7 miles	1.7 miles	.8 mile	2 miles
Steep Ascent/Descent Slopes > 40 percent	4 miles	3.8 miles	3 miles	3 miles
Steep Side Slopes ≥ 40 percent	0	0	.6 mile	0

TABLE B-4 (Continued)

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Landslide Areas	4 miles	1.5 miles	4 miles	1.5 miles
Incised Channels	0	9 miles	0	0
Prime Farmland	.3 mile	2.2 mile	0	1.5 miles
Farmland of Statewide Importance	.3 mile	1.0 mile	0	.4
Agricultural Lands	0.6 mile	3.2 miles	0	2.5 miles
Rangeland	10.4 miles	9.8 miles	15 miles	11.5 miles
Timber Lands	23 miles	9 miles	9 miles	16 miles
Pinyon Juniper	0	12 miles	0	0
AUMs - Livestock	34 AUMs	31 AUMs	24 AUMs	30 AUMs
Key Deer Range	0	1.4 miles	0	0
Key Elk Range	16.4 miles	8.5 miles	0	9.8 miles
Key Grouse Range	0	0	0	0
Key Antelope Range	0	0	0	0
Historical Raptor Nests	0	1	0	0
Bald Eagle Winter Range	2 miles	4.7 miles	1 mile	2.4 miles
Black-Footed Ferret Habitat	3 miles	3 miles	0	3 miles
Threatened and Endangered Plant Habitat	0.5 mile	0	1 mile	0
Cultural Resources Projected Sites within 75 foot-ROW	21	17	17	20
Cultural Resources High Sensitivity Areas	18 miles	9 miles	4 miles	12 miles

TABLE B-4 (Continued)

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Cultural Resources Medium Sensitivity Areas	13 miles	21 miles	20 miles	16 miles
Visual Contrasts (High)	0 miles	6.7 miles	0.3 miles	2.1 miles
Visual Contrasts (Moderate)	2.5 miles	5.5 miles	3.5 miles	1 mile
Irrigation Ditches	7	2	6	2
Major Rail Crossings	0	0	0	0
Federal Highway Crossings	0	2	0	0
State Highway Crossings	1	3	1	1
Residences within 500 feet of ROW	0	25	0	14
Solid and Hazardous Waste	480 (cubic yards)	440 (cubic yards)	340 (cubic yards)	420 (cubic yards)

Infrastructure Requirements. Infrastructure requirements would remain unchanged with the exception of access routes. Approximately 25.5 miles of right-of-way access roads would require grading or other improvements compared to 15.0 miles for the TransColorado proposed route and 7.7 for the agency preferred route.

Work Force Requirements and Schedule. Work force requirements would be the same as those for the corresponding TransColorado proposed route and agency preferred route. Construction would be decreased by 7 days.

Mancos Valley Central Route Variation

The Mancos Valley Central Route Variation would be the same as the TransColorado proposed route from Milepost 210.1 to Milepost 229.4 and then replace the corresponding section of the TransColorado proposed route. It would be the same as the agency preferred route from Milepost 210.1 to Milepost 219.6 and then replace the corresponding section of the agency preferred route (Figure B-3). The Mancos Valley Central Route Variation would be constructed on private land and on San Juan National Forest land outside an existing utility corridor.

Pipeline System Components. Table B-3 compares the land ownership and parallel facilities of the various routes. Implementation of the Mancos Valley Central Route Variation would require the construction of the Dolores Compressor Station Alternate Site 1 or the Alternate Site 2. The Proposed Dolores Compressor Station would not be feasible. The Mancos Valley Central Route Variation is 4.0 miles shorter than the corresponding TransColorado proposed route and 1.0 mile shorter than the agency preferred route.

Natural Resource Requirements. This route variation would use 90 fewer cubic yards of trench material than the TransColorado proposed route and 3 fewer yards than the agency preferred route. Table B-4 compares the occurrence of natural resources crossed by the various routes.

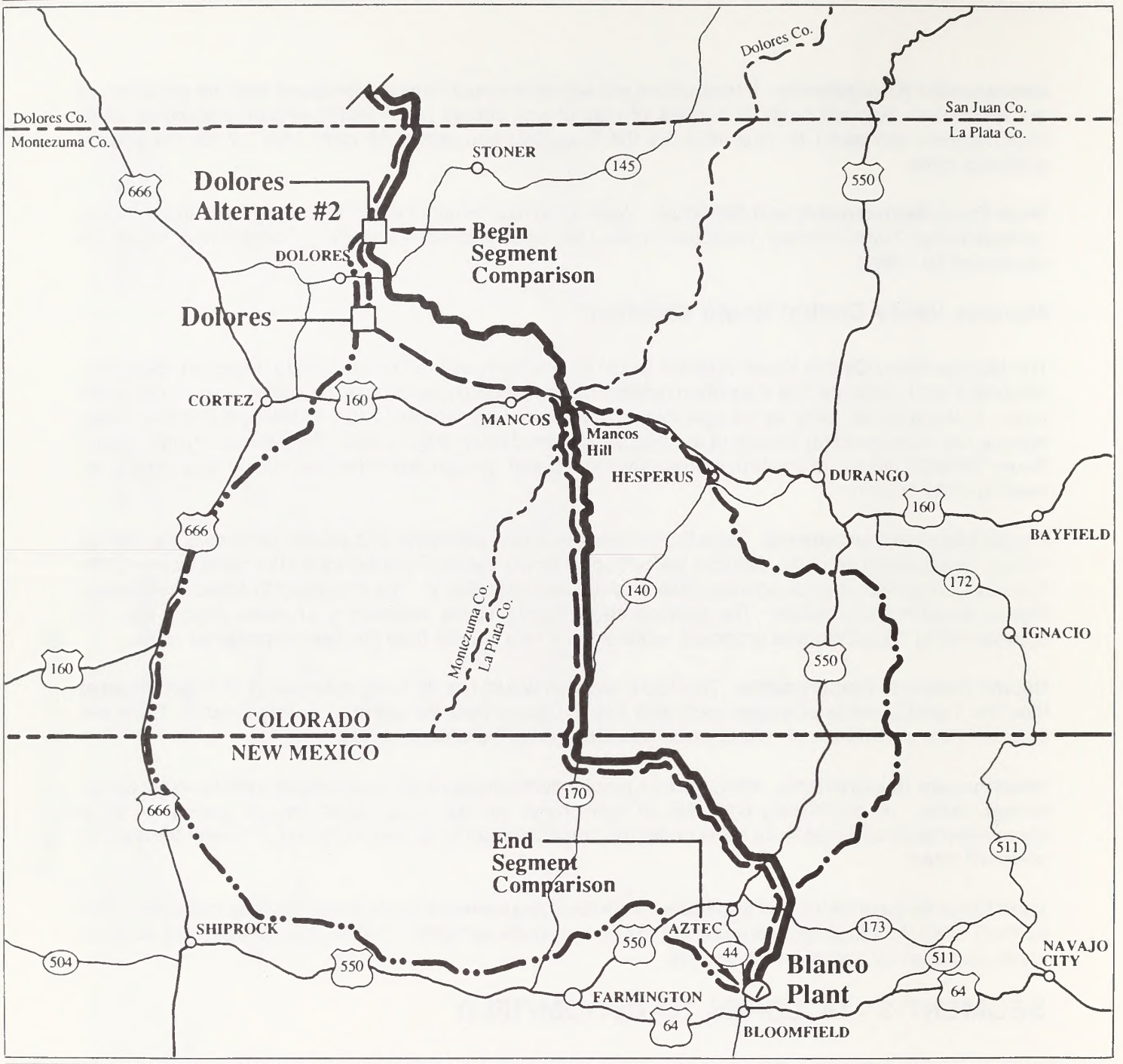
Infrastructure Requirements. Infrastructure requirements would remain unchanged with the exception of access routes. Approximately 8.5 miles of right-of-way access roads would require grading or other improvements as opposed to 15 miles under the TransColorado proposed route and 7.7 under the agency preferred route.

Work Force Requirements and Schedule. Work force requirements would be the same as those described for the TransColorado proposed route and the agency preferred route. Construction of this route variation would decrease by approximately 4 days.

SEGMENT 3 - DOLORES TO BLOOMFIELD

Segment 3 begins at Dolores and ends at Bloomfield, New Mexico. Through Segment 2, the TransColorado proposed route and the agency preferred route are different from Dolores to Mancos Hill (see description for Segment 2) and the same from Mancos Hill to Bloomfield (Figure B-4).

Through Segment 3 there are two route variations that could replace a corresponding section of either the TransColorado proposed route or the agency preferred route: The San Juan Valley Route Variation or the Animas Valley Route Variation (Figure B-4).



Proposed Pipeline Route

Agency Preferred Route

Animas Valley Variation

San Juan Valley Variation

Proposed Compressor Station

Proposed Meter Station

SEGMENT #3
ANIMAS VALLEY &
SAN JUAN VALLEY
VARIATIONS

FIGURE B-4

TRANSCOLORADO GAS TRANSMISSION PROJECT

Animas Valley Route Variation

The Animas Valley Route Variation begins at Dolores and ends at Bloomfield. This variation would be the same as the TransColorado proposed from Dolores to Mancos Hill. At Mancos Hill, this route would then replace the TransColorado proposed route/agency preferred route (both routes are the same from Mancos Hill to Bloomfield). This route variation travels into La Plata County, Colorado, south of the town of Hesperus, southwest of Durango, across the Southern Ute Indian Reservation, and into San Juan county, New Mexico.

Pipeline System Components. Implementation of the Animas Valley Route Variation would require the construction of the Dolores Compressor Station Alternate 1 site or the Alternate 2 site (Figure B-4). The Proposed Dolores Compressor Station would not be feasible unless the agency preferred route were selected through the Mancos area. This route variation would be 8 miles longer than the corresponding TransColorado proposed route and 11 miles longer than the agency preferred route (Table B-5). It would parallel at least one linear facility for 52 miles. The corresponding TransColorado proposed route would parallel at least one facility for 57 miles, a difference of 5 miles. The corresponding agency preferred route would parallel at least one facility for 76 miles, a difference of 24 miles.

Natural Resource Requirements. The Animas Valley Route Variation would require 210 more cubic yards of trench padding material than the corresponding TransColorado proposed route and 300 more cubic yards of trench padding material than the corresponding agency preferred route. This route variation would cross one potential source of water for testing and dust control in comparison to the two sources crossed by the corresponding route. Table B-6 compares the occurrence of natural resources along the various routes.

Infrastructure Requirements. Infrastructure requirements would remain unchanged with the exception of haul routes. Approximately 18 miles of right-of-way access roads would require grading or other improvements compared to 28 miles of roads on the corresponding TransColorado proposed route, a difference of 10 miles. The corresponding agency preferred route would require improvements to 21 miles of right-of-way access roads, a difference of 3 miles.

Work Force Requirements and Schedule. Work force requirements would remain the same as those described for the TransColorado proposed route/agency preferred route. Construction would be increased by 6 days.

San Juan Valley Route Variation

The San Juan Valley Route Variation begins at Dolores and ends at Bloomfield, New Mexico, bypassing the Mancos Valley area (Segment 2). This route variation would cross east of the town of Cortez in Montezuma County, travel south across portions of the Ute Mountain and Navajo Indian Reservations and into San Juan County, New Mexico. This route variation would replace all of the routes through the Mancos Valley, including the Animas Valley Route Variation.

Pipeline System Components. Implementation of the San Juan Valley Route Variation would require the construction of any one of the Dolores compressor stations (Figure B-4). This route variation is 15 miles longer than the corresponding TransColorado proposed route from Dolores to Bloomfield and 18 miles longer than the corresponding agency preferred route from Dolores to Bloomfield. The San Juan Valley Route Variation would parallel at least one utility corridor for 89 miles compared to 57 miles on the corresponding TransColorado proposed route (Table B-5), a difference of 32 miles. The agency preferred route would parallel at least one utility corridor for 76 miles, a difference of 13 miles.

TABLE B-5

Land Ownership and Parallel Facilities
San Juan Valley and Animas Valley Route Variations
versus the TransColorado Proposed and Agency Preferred Routes

Length	Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Length	82 miles	79 miles	97 miles	90 miles
Ownership-Private	54 percent	64 percent	40 percent	34 percent
Ownership - BLM	24 percent	27 percent	19 percent	23 percent
Ownership - National Forest	15 percent	4 percent	1 percent	20 percent
Ownership - State	7 percent	5 percent	3 percent	9 percent
Ownership - Indian	0 percent	0 percent	37 percent	14 percent
Total Disturbance	745 acres	718 acres	881 acres	818 acres
Parallel Facilities	57 miles	76 miles	89 miles	52 miles
Road Improvement	28 miles	21 miles	46 miles	18 miles
Existing Compressor Station	0	0	0	0
Proposed Compressor Stations	1	1	1	1
Proposed Meter Stations	1	1	1	1
Proposed Block Valve	5	5	5	6

TABLE B-6

Occurrence of Natural Resources
San Juan Valley and Animas Valley Route Variations versus the TransColorado Proposed and Agency Preferred Routes

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Paleonotlogical Formations	1 mile	.5 mile	.5 mile	1 mile
Oil and Gas Fields	24 miles	24 miles	30 miles	51 miles
Coal Bed Methane	24 miles	24 miles	28 miles	52 miles
Coal Formations	24 miles	24 miles	55 miles	56 miles
Strippable Coal	6 miles	9 miles	3 miles	0
Oil Shale (<25 gallons/ton)	0	0	0	0
Oil Shale (>25 gallons/ton)	0	0	0	0
Major Rivers Crossed	2	2	2	2
Major Streams Crossed	2	1	0	2
Minor Streams Crossed	8	7	11	7
Wet Meadow/Hayland	.5 mile	.3 mile	.09 mile	.4 mile
Forested Wetlands	.6 mile	.5 mile	.5 mile	.2 mile
Shrubland Wetland	.1 mile	.09 mile	.1 mile	.07 mile
Saline/Alkaline Soils	0	0	61 miles	0
Rocky/Shallow/Wetland Soils	28 miles	36 miles	20 miles	39 miles
Steep Slopes Ascent/Descent >15 percent <40 percent	4.4 miles	3.4 miles	3.4 miles	4.9 miles
Steep Ascent/Descent Slopes ≥ 40 percent	3.6 miles	3.4 miles	2.3 miles	4.5 miles
Steep Side Slopes ≥ 40 percent	0	0	0	0

TABLE B-6 (CONTINUED)

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Landslide Areas	6.5 miles	4 miles	2.5 miles	10.5 miles
Incised Channels	10 miles	19 miles	44 miles	16 miles
Prime Farmlands	5.8 miles	7 miles	10.8 miles	.7 miles
Farmland of Statewide Importance	.3 miles	1.0 miles	3.5 miles	5.5 miles
Agricultural Lands	13 miles	15.7 miles	14.3 miles	6.2 miles
Rangeland	39.8 miles	33.0 miles	69.6 miles	44 miles
Timber Lands	14.8 miles	.4 mile	.1 mile	20.4 miles
Pinyon-Juniper	18.4 miles	30 miles	13 miles	19.5 miles
AUMS - Livestock	82 AUMs	79 AUMs	97 AUMs	90 AUMs
Key Deer Range	21.5 miles	1.4 miles	12.6 miles	10 miles
Key Elk Range	36.7 miles	28.8 miles	3.9 miles	33.7 miles
Key Grouse Range	0	0	0	0
Key Antelope Range	0	0	0	0
Historical Raptor Nests	1	3	1	1
Bald Eagle Winter Range	12.6 miles	15.4 miles	4 miles	6.3 miles
Potential Black-Footed Ferret Habitat	0	0	31.6 miles	0
Threatened and Endangered Plant Habitat	12.3 miles	11.3 miles	55 miles	12 miles
Cultural Resources Projected Sites within 75-foot ROW	61	57	172	44
Cultural Resources High Sensitivity	53 miles	53 miles	75 miles	76 miles
Cultural Resources Medium Sensitivity	16 miles	16 miles	16 miles	4 miles

TABLE B-6 (CONTINUED)

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Visual Contrasts (High)	0.9 miles	7.7 miles	7.8 miles	2.5 miles
Visual Contrasts (Moderate)	9 miles	12.5 miles	14.5 miles	8 miles
Irrigation Ditches	10	5	8	10
Major Rail Crossings	0	0	0	1
Federal Highway Crossings	2	4	2	3
State Highway Crossings	3	5	4	2
Residences within 500 feet of ROW	28	42	25	27
Solid and Hazardous Waste	1171 (cubic yards)	1120 (cubic yards)	1380 (cubic yards)	1280 (cubic yards)

Natural Resource Requirements. The San Juan Route Variation would require 355 additional cubic yards of trench padding material. The San Juan Valley Route Variation would cross two sources of hydrostatic test water, the same as the corresponding Transcolorado proposed route.

Infrastructure Requirements. Infrastructure requirements would remain unchanged with the exception of haul routes. Approximately 46 miles of right-of-way access roads would require grading or other improvements compared to approximately 28 miles for the TransColorado proposed route and 21 miles for the agency preferred route.

Work Force Requirements and Schedule. Work force requirements would be the same as those described for the TransColorado proposed route. Construction would be increased by 10 days.

COMPARISON OF IMPACTS

SEGMENT 1 IMPACTS

Table B-7 compares impacts of the TransColorado proposed route/agency preferred route and the Grand Valley Route Variation:

SEGMENT 2 IMPACTS

Table B-8 compares impacts of the various routes through Segment 2.

SEGMENT 3 IMPACTS

Table B-9 compares impacts of the various routes through Segment 3.

TABLE B-7

Summary Impact Comparisons for
Grand Valley Variation vs. TransColorado's Proposed Preferred Route

	TransColorado Proposed/Agency Preferred	Grand Valley Variation
Air Quality	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 36 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 50 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.
Topography	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years). Cut-and-fill actions on side slopes greater than 40 percent would be required only where topographic constraints limit other route options.	Cut-and-fill actions to establish a level ROW on steep side slope terrain (40 percent slope or greater) would decrease the amount of natural slope contour on 16 acres for the long term (greater than 50 years). Cut-and-fill actions on side slopes greater than 40 percent would be required only where topographic constraints limit other route options. These slope alterations represent less than 1 percent of the construction ROW area.
Leasable Minerals	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.
Mineral Materials	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.
Water Quality	Trenching, pipe-laying, and backfilling in 1 major river, 2 major streams and 1 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days.	Trenching, pipe-laying, and backfilling in 1 major river and 2 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days.
Municipal Water Supplies	Clearing, grading, trenching, and backfilling 36 acres of ROW within the Palisade municipal watershed would slightly increase soil erosion, and slightly decrease the permeability of ROW soils over the short term (1 to 3 years). The pipeline would avoid all spring clusters and intakes.	Clearing, grading, trenching, and backfilling would not occur in any municipal watersheds.

TABLE B-7 (Continued)

	TransColorado Proposed/Agency Preferred	Grand Valley Variation
Wetlands	Pipeline construction would decrease available wetland areas by disturbing 5.4 acres of wet meadows/haylands, 2 acres of shrub wetlands and 0.2 acres of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction.	Pipeline construction would decrease available wetland areas by disturbing 0 acres of wet meadows/haylands, 1 acre of shrub wetlands, and 2 acres of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction.
Soils	Construction would increase soil erosion for the short term generally stabilized to preconstruction levels within 2 years, some increased erosion would be expected on the entire 464 acres; saline/alkaline soils (168 acres), steep ascent/descent slopes ≥ 15 percent (60 acres), and shallow/rocky soils (209 acres) where revegetation may be more difficult. Over the long term, wind and water erosion losses and vegetation productivity losses from pipeline construction disturbance would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term generally stabilized to preconstruction levels within 2 years, some increased erosion would be expected on the entire 636 acres; saline/alkaline soils (445 acres), steep ascent/descent slopes ≥ 15 percent (33 acres), and shallow/rocky soils (436 acres) where revegetation may be more difficult. Over the long term, wind and water erosion losses and vegetation productivity losses from pipeline construction disturbance would not likely exceed those presently occurring on adjacent, undisturbed soils.
Prime Farmland and Farmland of Statewide Importance	Pipeline construction would decrease farmland areas by disturbing 0 acres of prime farmland, and 71 acres of farmlands of statewide importance. Impacts to farmlands would be short term (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.	Pipeline construction would decrease farmland areas by disturbing 28 acres of prime farmland, and 42 acres of farmlands of statewide importance. Impacts to farmlands would be short term (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction. Pipeline construction would decrease orchards by disturbing 6 acres. Impacts to orchards would be long-term impacts of less than 5 percent of total area orchards.
Forestry	Clearing the ROW would decrease forestry resources by approximately 9 acres of timber resources (Douglas fir, ponderosa pine, aspen) and a decrease of 105 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 9 acres of timber resources (Douglas fir, ponderosa pine, aspen) and a loss of 19 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.
Livestock	Clearing the ROW would decrease available grazing land by approximately 51 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 70 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.

TABLE B-7 (Continued)

	TransColorado Proposed/Agency Preferred	Grand Valley Variation
Wildlife	ROW clearing would result in decreases in the following types of habitat: 223 acres of key mule deer range, 82 acres of key elk range, and 43 acres of sage grouse breeding nesting habitat. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long-term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing would result in decreases in the following types of habitat: 159 acres of key mule deer range, 173 acres of key elk range, 227 acres of key antelope range, and 50 acres of sage grouse breeding nesting habitat. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long-term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.
Fisheries	The pipeline would be constructed across 1 major river, 2 major streams, and 1 minor perennial stream. Of these, 1 is classified as Class 1 coldwater aquatic resources, while the remaining area Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 1 major stream and 2 minor perennial streams. None of these streams are classified as Class 1 coldwater aquatic resources. They are classified as Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.
Cultural Resources	Construction would result in the direct disturbance and data recovery of 12 projected archaeological sites within 75-feet of the ROW. The proposed route would traverse 39 miles of high-sensitivity areas and 10 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	Construction would result in the direct disturbance and data recovery of 14 projected archaeological sites within 75 feet of the ROW. The route would traverse 21 miles of high-sensitivity areas and 23 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.
Visual Resources	Potentially 1.2 miles of high, short-and long-term visual impacts would occur along the ROW. These impacts would exceed the visual management objectives for these areas.	Approximately 5.8 miles of high, short-and long-term visual impacts would occur along the ROW. These impacts would exceed the visual management objectives for these areas.

TABLE B-7 (Continued)

	TransColorado Proposed/Agency Preferred	Grand Valley Variation
Transportation	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 33 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 30 miles of dirt/gravel road.
Solid Hazardous Waste	An estimated 720 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.	An estimated 1,000 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.
Socioeconomic Conditions	The route would comply with county land use plans. Crop production would be suspended within the 75-foot construction ROW for one growing season; 70 acres would be affected. Construction and operation of the pipeline would expose 5 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 182 acres would be affected. The pipeline would cross 1 parcel less than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 14 percent of the parcel. First year of operation would yield an estimated $750,600 in property tax revenue.	The route would comply with county land use plans. Crop production would be suspended within the 75-foot construction ROW for one growing season; 73 acres would be affected. Construction and operation of the pipeline would expose 49 residences to short term (2 to 3 weeks) increases in construction related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 145 acres would be affected. This variation would cross the rural residential community of Clifton. The pipeline would cross 38 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 20 percent of the area parcels. First year of operation would yield an estimated $980,000 in property tax revenue.

TABLE B-8

Summary Impact Comparisons for
Mancos Valley East and Mancos Valley West Route Variations
vs. the TransColorado Proposed and Agency Preferred Routes

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Air Quality	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 24 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 22 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 17 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 21 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.
Topography	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years).	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years).	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on 16 acres for the long term (greater than 50 years). Cut-and-fill actions on side slopes greater than 40 percent would be required only where topographic constraints limit other route options. These slope alterations represent less than 1 percent of the construction ROW area.	Cut-and-fill actions to establish a level ROW on steep side terrain slope (40 percent slope or greater) would decrease the amount of natural slope contour on no acres for the long term (greater than 50 years).
Leasable Minerals	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified. Future conflicts could occur on .75 square miles of coal deposits that could be strip mined.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.

TABLE B-8 (Continued)

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Mineral Materials	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.
Water Quality	Trenching, pipe-laying, and backfilling in 1 major river, 2 major streams, and 3 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.	Trenching, pipe-laying, and backfilling in 1 major river, 1 major stream and 2 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.	Trenching, pipe-laying, and backfilling in 1 major river, 3 major streams and 3 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.	Trenching, pipe-laying, and backfilling in 1 major river and 4 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.
Municipal Water Supplies	Construction of the pipeline would trench across one water supply stream (Dolores River).	Construction of the pipeline would trench across one water supply stream (Dolores River).	Construction of the pipeline would trench across one water supply stream (Dolores River).	Construction of the pipeline would trench across one water supply stream (Dolores River).
Bureau of Reclamation Water Projects	No Bureau of Reclamation water projects would be crossed along this segment.	No Bureau of Reclamation water projects would be crossed along this segment.	Based on TransColorado's commitments to bore under lined canals, trench through unlined canals when they are not in use, restore the canals to their original condition, and to monitor for canal integrity for 2 years, the pipeline would not affect irrigation water deliveries or canal integrity.	No Burea of Reclamation water projects would be crossed along this segment.

TABLE B-8 (Continued)

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Wetlands	Pipeline construction would decrease available wetland areas by disturbing 2.7 acres of wet meadows/haylands, .6 acre of wet shrublands, and 1.2 acres of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 4.5 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing .4 acre of wet meadows/haylands, .5 acre of wet shrublands, and .7 acre of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 1.6 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing .1 acre of wet meadows/haylands, 0 acres of wet shrublands, and 2 acres of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 2.1 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing 2.7 acres of wet meadows/haylands, .6 acre of wet shrublands, and .8 acre of forested wetlands. The disturbance of wet meadows/haylands would be short term, and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 4 acres of wetland soils disturbed by construction.
Soils	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 309 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (52 acres), or rocky shallow soils (164 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 281 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent 50 acres, or rocky shallow soils (173 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 218 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (34 acres), or rocky shallow soils (82 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the short term, generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 273 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes $\geq$ 15 percent (45 acres), or rocky shallow soils (145 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.

TABLE B-8 (Continued)

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Prime Farmland and Farmland of Statewide Importance	Pipeline construction would decrease farmland areas by disturbing 2.7 acres of prime farmland, and 2.7 acres of farmlands of statewide importance. Impacts to farmlands would be short term (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.	Pipeline construction would decrease farmland areas by disturbing 20 acres of prime farmland, and 9.1 acres of farmlands of statewide importance. Impacts to farmlands would be short term (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.	Pipeline construction would not affect prime farmland for this alternative.	Pipeline construction would decrease farmland areas by disturbing 13.6 acres of prime farmland, and 3.6 acres of farmlands of statewide importance. Impacts to farmlands would be short term (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.
Forestry	Clearing the ROW would decrease forestry resources by approximately 209 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 82 acres of timber resources (Douglas fir, ponderosa pine, aspen) and a loss of 109 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 82 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 145 acres of timber resources (Douglas fir, ponderosa pine, aspen), and a loss of no acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.
Livestock	Clearing the ROW would decrease available grazing land by approximately 34 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 31 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 24 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 30 AUMs. This would be a short term impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.

TABLE B-8 (Continued)

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Wildlife	ROW clearing would result in vegetation decreases in 149 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing would result in decreases in the following types of habitat: 13 acres of key mule deer range and 77 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing for this alternative would not result in vegetation losses for key mule deer range, key elk range, key antelope range, or sage grouse breeding/nesting range.	ROW clearing would result in vegetation decreases in 89 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.
Fisheries	The pipeline would be constructed across 1 major river, 2 major streams and 3 minor perennial streams. Of these, 5 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 1 major river, 1 major stream, and 2 minor perennial streams. Of these, 3 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 1 major river, 3 major streams, and 5 minor perennial streams. Of these, 5 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 1 major river, 1 major stream, and 5 minor perennial streams. Of these, 3 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.

TABLE B-8 (Continued)

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Socioeconomic	The proposed route would require 20 miles of National Forest land to be designated as a new multiple utility corridor. The route would comply with county land use plans. Crop production would be suspended within the 75-foot construction ROW for one growing season; 5 acres would be affected. Construction and operation of the pipeline would expose 0 residences to short term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 60 acres would be affected. The pipeline would cross 15 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 12 percent of the area. First year of operation would yield an estimated $472,600 in property tax revenue.	The proposed route would require 11 miles of National Forest land to be designated as a new multiple utility corridor. The route would not comply with county land use plans in so much as it conflicts with a Montezuma County resolution, closing the Mancos Valley to further development of pipeline corridors. Crop production would be suspended within the 75-foot construction ROW for one growing season; 29 acres would be affected. Construction and operation of the pipeline would expose 25 residences to short term (2 to 3 weeks) increases in construction related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 97 acres would be affected. The pipeline would cross 6 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 26 percent of the area. First year of operation would yield an estimated $444,800 in property tax revenue.	The proposed route would require 21.6 miles of National Forest land to be designated as a new multiple utility corridor. The route would comply with county land use plans. No crop production would be affected by this alternative. Construction and operation of the pipeline would expose 0 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 13 acres would be affected. The pipeline would cross 0 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 0 percent of the area. First year of operation would yield an estimated $430,900 in property tax revenue.	Construction and operation of the pipeline would expose 14 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 91 acres would be affected. The pipeline would cross 3 parcels or fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 7 percent of the area. First year of operation would yield an estimated $430,900 in property tax revenue.

TABLE B-8 (Continued)

	TransColorado Proposed	Agency Preferred	Mancos Valley East Variation	Mancos Valley Central Variation
Cultural Resources	Construction would result in the direct disturbance and data recovery of 21 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 18 miles of high-sensitivity areas and 13 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	Construction would result in the direct disturbance and data recovery of 17 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 9 miles of high-sensitivity areas and 21 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	Construction would result in the direct disturbance and data recovery of 17 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 4 miles of high-sensitivity areas and 20 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	Construction would result in the direct disturbance and data recovery of 20 project archaeological sites within the ROW. The proposed route would traverse 12 miles of high-sensitivity areas and 16 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.
Visual Resources	There would be no high, short-and long-term visual impacts along the ROW.	Approximately 6.7 miles of high, short-and long-term visual impacts along the ROW would exceed the visual management objectives for these areas.	Approximately 0.3 miles of high, short-and long-term visual impacts along the ROW would exceed the visual management objectives for these areas.	Approximately 2.1 miles of high, short-and long-term visual impacts along the ROW would be unavoidable adverse impacts that would exceed the visual management objectives for these areas.
Transportation	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 15 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 7.7 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 25.5 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 8.5 miles of dirt/gravel road.
Solid Hazardous Waste	An estimated 480 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.	An estimated 440 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.	An estimated 340 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.	An estimated 420 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.

TABLE B-9

Summary Impact Comparisons for
San Juan and Animas Valley Route Variations
vs. the TransColorado Proposed and Agency Preferred Routes

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Air Quality	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the short term along 1.4 pipeline miles per day for an estimated 58 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the along 1.4 pipeline miles per day for an estimated 56 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the along 1.4 pipeline miles per day for an estimated 69 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.	Fuel combustion by pipeline construction equipment would increase the concentrations of carbon monoxide, unburned hydrocarbons, particulate matter, and fugitive dust for the along 1.4 pipeline miles per day for an estimated 64 construction days; the same pollutants would be emitted for an estimated 90-day construction period at each of the seven compressor sites.
Topography	No cut-and-fill actions on side slopes greater than 40 percent would be required.	No cut-and-fill actions on side slopes greater than 40 percent would be required.	No cut-and-fill actions on side slopes greater than 40 percent would be required.	No cut-and-fill actions on side slopes greater than 40 percent would be required.
Leasable Minerals	No existing conflicts with oil and gas development, and active coal, oil shale leases were identified. Potential future coal development conflicts could occur on 1.5 square miles underlain by strippable coal.	No existing conflicts with oil and gas development, and active coal, oil shale leases were identified. Potential future coal development conflicts could occur on 2.25 square miles underlain by strippable coal.	No existing conflicts with oil and gas development were identified. This Variation crosses approximately 4 miles of the active San Juan coal lease west of Farmington. The pipeline would not cross currently active mining areas. Potential future coal development conflicts could occur on .75 square mile underlain by strippable coal.	No potential conflicts with oil and gas development, and active coal, oil shale leases were identified.
Mineral Materials	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.	No direct pipeline ROW conflicts with active mineral materials operations were identified. There is some likelihood of future access preclusion to unleased mineral materials, but economic importance of these preclusions are expected to be small.

TABLE B-9 (Continued)

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Water Quality	Trenching, pipe-laying, and backfilling in 2 major rivers, 2 major streams, and 8 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.	Trenching, pipe-laying, and backfilling in 2 major rivers, 1 major stream, and 7 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing.	Trenching, pipe-laying, and backfilling in 2 major rivers and 11 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing. The Dolores River water development project would be crossed. This would result in disturbance resulting from the construction of the bored crossing.	Trenching, pipe-laying, and backfilling in 2 major rivers, 2 major streams and 7 minor perennial streams would result in short-term increases in suspended sediment during the pipeline installation period that would range from 1 to 5 days per crossing. The Florida water project would be crossed. disturbance would occur related to crossing of irrigation facilities.
Municipal Water Supplies	Trenching of the pipeline would cross one water supply stream (Dolores River).	Trenching of the pipeline would cross one water supply stream (Dolores River).	Trenching of the pipeline would cross one water supply stream (Dolores River).	Trenching of the pipeline would cross one water supply stream (Dolores River).
Bureau of Reclamation Water Projects	No Bureau of Reclamation water projects would be crossed along this segment.	No Bureau of Reclamation water projects would be crossed along this segment.	Based on TransColorado's commitments to bore under lined canals, trench through unlined canals when they are not in use, restore the canals to their original condition, and to monitor for canal integrity for 2 years, the pipeline would not affect irrigation water deliveries or canal integrity.	Based on TransColorado's commitments to bore under lined canals, trench through unlined canals when they are not in use, restore the canals to their original condition, and to monitor for canal integrity for 2 years, the pipeline would not affect irrigation water deliveries or canal integrity.
Wetlands	Pipeline construction would decrease available wetland areas by disturbing 4.5 acres of wet meadows/haylands, 1 acre of wet shrublands, and 5.4 acres of forested wetlands. The disturbance of wet meadows/haylands would be , and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 11 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing 2.7 acres of wet meadows/haylands, .8 acre of wet shrublands, and 4.5 acres of forested wetlands. The disturbance of wet meadows/haylands would be , and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 8 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing .8 acre of wet meadows/haylands, 1 acre of wet shrublands, and 4.5 acres of forested wetlands. The disturbance of wet meadows/haylands would be , and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 6.3 acres of wetland soils disturbed by construction.	Pipeline construction would decrease available wetland areas by disturbing 3.6 acres of wet meadows/haylands, .6 acre of wet shrublands, and 1.8 acres of forested wetlands. The disturbance of wet meadows/haylands would be , and the disturbance of shrublands and forested wetlands would be long term. Much less than 1 percent of the wetlands in any watershed would be impacted by pipeline construction. Short-term increases in soil erosion would also occur on 6 acres of wetland soils disturbed by construction.

TABLE B-9 (Continued)

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Soils	Construction would increase soil erosion for the , generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 745 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes ≥ 15 percent (73 acres), or rocky shallow soils (254 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the , generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 718 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes ≥ 15 percent (62 acres), or rocky shallow soils (327 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the , generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 881 acres. On areas of saline/alkaline soils (554 acres), steep ascent descent slopes ≥ 15 percent (52 acres), or rocky shallow soils (182 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.	Construction would increase soil erosion for the , generally stabilizing to pre-construction levels within 2 years. Some increased erosion would be expected on the entire 818 acres. On areas of saline/alkaline soils (0 acres), steep ascent descent slopes ≥ 15 percent (85 acres), or rocky shallow soils (354 acres) revegetation may be more difficult. Over the long term wind and water erosion losses and vegetation productivity losses from pipeline construction disturbances would not likely exceed those presently occurring on adjacent, undisturbed soils.
Prime Farmland and Farmland of Statewide Importance	Pipeline construction would decrease farmland areas by disturbing 53 acres of prime farmland, and 2.7 acres of farmlands of statewide importance. Impacts to farmlands would be (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.	Pipeline construction would decrease farmland areas by disturbing 64 acres of prime farmland, and 9 acres of farmlands of statewide importance. Impacts to farmlands would be (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.	Pipeline construction would decrease farmland areas by disturbing 98 acres of prime farmland, and 32 acres of farmlands of statewide importance. Impacts to farmlands would be (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.	Pipeline construction would decrease farmland areas by disturbing 6 acres of prime farmland, and 50 acres of farmlands of statewide importance. Impacts to farmlands would be (one growing season). A fraction of one percent of farmlands in any county crossed by the pipeline would be taken out of production as a result of pipeline construction.
Forestry	Clearing the ROW would decrease forestry resources by approximately 135 acres of timber resources (Douglas fir, ponderosa pine, aspen) and 167 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 4 acres of timber resources (Douglas fir, ponderosa pine, aspen) and 273 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 1 acre of timber resources (Douglas fir, ponderosa pine, aspen) and 118 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.	Clearing the ROW would decrease forestry resources by approximately 185 acres of timber resources (Douglas fir, ponderosa pine, aspen) and 177 acres of pinyon-juniper woodlands. These would be long-term impacts of less than 1 percent of the adjacent forested lands.

TABLE B-9 (Continued)

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Livestock	Clearing the ROW would decrease available grazing land by approximately 82 AUMs. This would be a impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 79 AUMs. This would be a impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 97 AUMs. This would be a impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.	Clearing the ROW would decrease available grazing land by approximately 90 AUMs. This would be a impact of less than one percent of the AUMs available in grazing allotments crossed by the pipeline. No reductions in stocking rates would occur in any allotments as a result of pipeline construction.
Wildlife	ROW clearing would result in decreases in the following types of habitat: 195 acres of key mule deer range and 334 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing would result in decreases in the following types of habitat: 13 acres of key mule deer range and 262 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing would result in decreases in the following types of habitat: 114 acres of key mule deer range and 35 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.	ROW clearing would result in decreases in the following types of habitat: 91 acres of key mule deer range and 306 acres of key elk range. Short-term impacts would include displacement of animals away from construction, and limited mortality of small, less mobile animals. These short-term impacts are unquantifiable. No population declines would result from pipeline construction for any species. Long term impacts would include disturbances of key game ranges and structural vegetation changes. These impacts would include less than 1 percent of the surrounding key game ranges, and vegetation types.

TABLE B-9 (Continued)

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Fisheries	The pipeline would be constructed across 2 major rivers crossed, 2 major streams and 8 minor perennial streams. Of these, 5 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 2 major rivers, 1 major stream, and 7 minor perennial streams. Of these, 4 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 2 major rivers and 11 minor perennial streams. Of these, 1 is classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.	The pipeline would be constructed across 2 major rivers, 2 major streams, and 7 minor perennial streams. Of these, 8 are classified as Class 1 coldwater aquatic resources, while the remaining are Class II, warmwater or coldwater aquatic resources. Pipeline construction would result in short-term increases in sedimentation and short-term disturbances of stream bed substrate and biota. The streambed disturbance would result in very limited fish mortality. No loss of fishery quality or recreational opportunities would occur as a result of pipeline construction.
Cultural Resources	Construction would result in the direct disturbance and data recovery of 61 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 53 miles of high-sensitivity areas and 16 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	Construction would result in the direct disturbance and data recovery of 57 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 53 miles of high-sensitivity areas and 16 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	Construction would result in the direct disturbance and data recovery of 172 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 75 miles of high-sensitivity areas and 16 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.	Construction would result in the direct disturbance and data recovery of 44 projected archaeological sites within the 75-foot ROW. The proposed route would traverse 76 miles of high-sensitivity areas and 4 miles of medium-sensitivity areas. The required Class III surveys and TransColorado's Programmatic Agreement would protect cultural resources and provide for data recovery where cultural resource sites must be disturbed. Disturbance to traditional cultural properties of Native Americans and indirect impacts due to unauthorized collection of surface artifacts may occur.

TABLE B-9 (Continued)

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Visual Resources	Approximately 0.9 mile of high, short-and long-term visual impacts would occur along the ROW and at four above-ground facility sites. These would be unavoidable adverse impacts that would exceed the visual management objectives for these areas.	Approximately 7.7 miles of high, short-and long-term visual impacts would occur along the ROW and at four above-ground facility sites. These would be unavoidable adverse impacts that would exceed the visual management objectives for these areas.	Approximately 7.8 miles of high, short-and long-term visual impacts would occur along the ROW and at four above-ground facility sites. These would be unavoidable adverse impacts that would exceed the visual management objectives for these areas.	Approximately 2.5 miles of high, short-and long-term visual impacts would occur along the ROW and at four above-ground facility sites. These would be unavoidable adverse impacts that would exceed the visual management objectives for these areas.
Noise	Construction noise impacts would generally be limited to residents living within 2,500 feet of the ROW for a period of 3 to 4 days.	Construction noise impacts would generally be limited to residents living within 2,500 feet of the ROW for a period of 3 to 4 days.	Construction noise impacts would generally be limited to residents living within 2,500 feet of the ROW for a period of 3 to 4 days.	Construction noise impacts would generally be limited to residents living within 2,500 feet of the ROW for a period of 3 to 4 days.
Transportation	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 28 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 21 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 46 miles of dirt/gravel road.	Construction would result in possible traffic delays during road crossings and would necessitate the improvement or grading of 18 miles of dirt/gravel road.
Solid Hazardous Waste	An estimated 1,170 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.	An estimated 1,120 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.	An estimated 1,380 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.	An estimated 1,280 cubic yards of construction related solid waste would be generated and disposed of in currently operating landfills along the pipeline route.

TABLE B-9 (Continued)

	TransColorado Proposed	Agency Preferred	San Juan Valley Variation	Animas Valley Variation
Socioeconomic	The proposed route would require 12 miles of National Forest land to be designated as a new multiple utility corridor. The route would comply with county land use plans. Crop production would be suspended within the 75-foot construction ROW for one growing season; 118 acres would be affected. Construction and operation of the pipeline would expose 28 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 267 acres would be affected. The pipeline would cross 13 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 13 percent of the area. First year of operation would yield an estimated $1,139,800 in property tax revenue.	The proposed route would require 3 miles of National Forest land to be designated as a new multiple utility corridor. The route would conflict with Montezuma County resolution to close Mancos Valley pipeline corridor. Crop production would be suspended within the 75-foot construction ROW for one growing season; 143 acres would be affected; 300 acres of rangeland would be removed from grazing for one year. Construction and operation of the pipeline would expose 53 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 363 acres would be affected. The pipeline would cross 19 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 17 percent of the area. First year of operation would yield an estimated $1,153,700 in property tax revenue.	The proposed route would require 1 mile of National Forest land to be designated as a new multiple utility corridor. The route would comply with county land use plans. This variation crosses the Hogback ACEC. The variation is not in compliance with the Farmington RMP management practice to avoid construction in this ACEC. The Glade Run Trail system is also crossed. Both areas would experience short-term disturbances from pipeline construction. Crop production would be suspended within the 75-foot construction ROW for one growing season; 130 acres would be affected. Construction and operation of the pipeline would expose 55 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 235 acres would be affected. The pipeline would cross 50 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 20 percent of the area. First year of operation would yield an estimated $1,348,300 in property tax revenue.	The proposed route would require 18 miles of National Forest land to be designated as a new multiple utility corridor. The route would comply with county land use plans. Crop production would be suspended within the 75-foot construction ROW for one growing season; 56 acres would be affected; 400 acres of rangeland would be removed from grazing for one year. Construction and operation of the pipeline would expose 27 residences to short-term (2 to 3 weeks) increases in construction-related noise. Structural improvements on private land would be prohibited within the 50-foot permanent ROW; 185 acres would be affected. The pipeline would cross 13 parcels of fewer than 20 acres. Combination of this pipeline ROW with existing parallel ROW would preclude the placement of buildings on 13 percent of the area. First year of operation would yield an estimated $1,112,000 in property tax revenue.

APPENDIX C

WETLANDS AND STREAM CROSSINGS

APPENDIX C-1

National Wetland Inventory Classification of Wetlands Traversed by the TransColorado Pipeline and Environmental Protection Measures Agency Preferred Route

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
2.6	Piceance Creek[6]		X		25	R4SBC	2	
2.51	Piceance Creek Hay Meadows			X	1,125	PEM2K	4	
5.42	Hunter Creek	X			5	PEMA	1	
8.6	Willow Creek[6]		X		5	PEM2C	1	
8.75	Willow Creek Hay Meadows			X	80	PEM2K	4	
15.6	Scandard Gulch			X	180	PFO1A	1	
19.9	West Fork Parachute Creek	X			15	PEMA	1	
24.2	Doe Creek	X		X	25	PFO1A	1	
25.3	Crystal Creek		X	X	140	PFO1A	1	
36.3	Conn Creek		X		30	R4SBC	1	2,3
	Conn Creek Riparian Zone			X	100	PSS1A	4	1,2,3
44.3	Roan Creek Riparian		X	X	50	PFO1Ab	2	1,2
44.5	Roan Creek Hay Meadows			X	180	PEM2K	4	

APPENDIX C-1 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
47.0	Unnamed tributary of Colorado River	X			25	R4SBC	1	
47.4	Colorado River		X		375	R3UBH	3	
	Colorado River Riparian Zone			X	500	PFO1A	4	1
47.6	Colorado River Hay Meadows			X	3,000	PEM2K	4	
50.7	Sand Wash	X			15	R4SBC	1	
59.4	Plateau Creek[6]		X		70	R2US1F	2	
66.0	Tate Creek	X		X	120	PFO1A		
69.2	Rapid Creek	X			20	PFO1A		
71.6	Cottonwood Creek	X			20	PFO1A	1	
74.2	Sink Creek	X			15	R4SBC	1	
81.2	Whitewater Creek	X			15	R4SBC	1	
81.2	Whitewater Creek Floodplain			X	30	PSS1A	4	
83.3	Unnamed Creek	X			20	R4SBA	1	
88.0	Kannah Creek	X			20	R4SBA	1	
	Kannah Creek Floodplain			X	50	PSS1C	4	
91.0	Indian Creek	X			20	R4SBA	1	
92.9	Deer Creek	X			20	R4SBA	1	

APPENDIX C-1 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
97.3	Wells Gulch	X			20	R4SBA	1	
103.6	Alkali Creek	X			20	PSS1A	1	
105.4	Gunnison River[6]		X		250	R2UBH	3	
105.0	Gunnison River Riparian Zone			X	2,000	PFO1A	4	1
105.6	Roubideau Creek		X		25	R4SBC	1	
	Roubideau Creek Riparian Zone			X	140	PFO1A	4	
108.1	Cottonwood Creek	X			20	R4SBC	1	
	Cottonwood Creek Riparian Zone			X	50	PFO1A	4	1
110.5	Roubideau Creek		X		25	R4SBC	1	
	Roubideau Creek Riparian Zone				50	PFO1A	4	
117.7	Roatcap Gulch	X			15	R4SBA	1	
119.3	Big Sandy Wash	X			15	PEM2K	1	
137.7	Grays Creek	X			15	PFO1A	1	
140.6	Kelly Creek	X			20	PFO1A	1	
143.5	Sheep Creek[6]		X		15	R4SBA	1	
145.5	Unnamed drainage of Cottonwood Creek	X			15	R4SBA	1	

APPENDIX C-1 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
150.5	San Miguel River Hay Meadows			X	150	PEM2K	4	
151.1	San Miguel River[6]		X		80	R2UB1F	3	
	San Miguel River Riparian Zone			X	70	PFO1A	4	
160.4	Maverick Draw Tributary			X	500	PEMA	4	
160.7	Maverick Draw[6]		X	X	500	PEMA	4	
169.9	Outlet of Cone Reservoir			X	200	PEMA	4	
172.5	Brewster Creek	X			15	R4SBC	1	
175.3	Bennet Creek	X			160	PFO1C	1	1
176.1	Stockdale Creek	X			120	PFO1C	1	1
176.3	Middle Naturita Creek	X			50	PFO1C	1	1
178.2	Spectacle Creek[6]		X		40	PFO1C	1	1
182.4	Morrison Creek		X		10	R4SBC	1	
	Morrison Creek Wetland Area			X	80, 60	PEM2A, PSS1C	4	
183.9	Disappointment Creek		X		15	R4SBC	1	
	Disappointment Creek Wetland Area			X	40	PEM2A	4	

APPENDIX C-1 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
194.4	Unnamed Pond	X			20	PUBHh	2	
194.9	Beaver Creek Tributary	X			15	PEM2A	4	
195.3	Beaver Creek Tributary	X			15	PEM2A	4	
196.7	Beaver Creek Tributary	X			15	PEM2A	4	
197.1	Beaver Creek	X			20	PEM2C	4	
201.6	Turkey Creek	X			15	R4SBC/PFO1A	1	
203.5	Boggy Draw	X			15	R4SBC/PFO1A	1	
204.5	House Creek	X			15	R4SBC/PFO1A	1	
205.3	House Creek	X			15	R4SBC/PFO1A	1	
205.7	House Creek	X			15	R4SBC/PFO1A	1	
211.8	Dolores River[6,8]		X		75	R3UBH	2	
	Dolores River Wetland Area			X	150	PFO1A	4	1
214.0	Lost Canyon Creek		X		15	R4SBC	1	
	Lost Canyon Wetland Area			X	60	PSS1A	4	
215.9	Cash Canyon	X			25	R4SBC/PSS1A	1	
218.1	Stinking Spring Canyon	X			20	R4SBC/PEM2A	1	

APPENDIX C-1 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
218.5	Stinking Spring Canyon	X			20	R4SBC	1	
223.4	Eastfork Mud Creek	X			20	PSS1A	4	
225.9	Chicken Creek[6,8]		X		15	R4SBF	1	
	Chicken Creek Riparian Zone			X	200	PSS1A	4	
228.4	West Mancos River[6,8]		X		20	R3UB1H	2	
	Mancos River Riparian Zone			X	60	PFO1A	4	1
	Mancos River Hay Meadows			X	250	PEM2K	4	
235.4	Cherry Creek	X			20	R4SBC	1	
236.4	Devils Canyon	X			15	R4SBA	1	
243.2	Alkali Gulch	X			15	R4SBA	1	
	Alkali Gulch Riparian Zone			X	50	PSS1A	4	
243.7	Alkali Gulch	X			15	R4SBA	1	
	Alkali Gulch Riparian Zone			X	100	PSS1A	4	
249.3	La Plata River		X		30	R2UB1H	1	
254.1	La Plata River		X		30	R2UB1H	1	

APPENDIX C-1 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
	La Plata River Hay Meadow			X	700	PEM2K	4	
255.2	La Plata River		X		30	R2UB1H	1	
259.2	La Plata River		X		30	R2UB1H	1	
259.4	La Plata River Riparian Zone			X	1,200	PFO1A	4	1
259.5	La Plata River Hay Meadow			X	800	PEM2K	4	
259.6	La Plata River		X		300	R2UB1H	1	
	La Plata River Riparian Zone				100	PFO1A	4	1
263.3	McDermott Arroyo	X			30	R4SBA	1	
264.6	Jaquez Arroyo	X			20	R4SBA	1	
269.6	Farmington Glade	X			50	R4SBA	1	
277.2	Animas River[7]		X		150	R2UB1H	3	
	Animas River Riparian Zone			X	300	PFO1A	4	1
278.1	Hart Canyon	X			100	R4SBA	1	
280.4	North Knowlton Canyon	X			100	R4SBA	1	

APPENDIX C-1 (CONTINUED)

Footnotes:

[1]I = Intermittent

[2]P = perennial

[3]WL/R = wetland/riparian

[4]Crossing Type:
1 = minor stream crossing
2 = major stream crossing
3 = major river crossing
4 = wetland/riparian area crossing

[5]Special Environmental Protection
1 = Align ROW to avoid loss of mature (>1-foot diameter) cottonwood and aspen trees.
2 = Align ROW to avoid active beaver ponds or artificial ponds, if present at the crossing.
3 = Apply incised channel setbacks.

[6]Aquatic Life, Class 1, Cold, Colorado - waters that are 1) capable of sustaining a wide variety of coldwater biota, including sensitive species, or 2) could sustain such biota for correctable water quality conditions.

[7]Coldwater Fishery; New Mexico

[8]High Quality, Class 2

APPENDIX C-2

Stream Crossings and Wetlands Traversed by the TransColorado Pipeline and Environmental Protection Measures TransColorado Proposed Route

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
2.6	Piceance Creek[6]		X		25	R4SBC	2	
2.51	Piceance Creek Hay Meadows			X	1,125	PEM2K	4	
5.42	Hunter Creek	X			5	PEMA	1	
8.6	Willow Creek[6]		X		5	PEM2C	1	
8.75	Willow Creek Hay Meadows			X	80	PEM2K	4	
15.6	Scandard Gulch			X	180	PFO1A	1	
19.9	West Fork Parachute Creek	X			15	PEMA	1	
24.2	Doe Creek	X		X	25	PFO1A	1	
25.3	Crystal Creek		X	X	140	PFO1A	1	
36.3	Conn Creek		X		30	R4SBC	1	2,3
	Conn Creek Riparian Zone			X	100	PSS1A	4	1,2,3
44.3	Roan Creek Riparian		X	X	50	PFO1Ab	2	1,2
44.5	Roan Creek Hay Meadows			X	180	PEM2K	4	

APPENDIX C-2 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
47.0	Unnamed tributary of Colorado River	X			25	R4SBC	1	
47.4	Colorado River		X		375	R3UBH	3	
	Colorado River Riparian Zone			X	500	PFO1A	4	1
47.6	Colorado River Hay Meadows			X	3,000	PEM2K	4	
50.7	Sand Wash	X			15	R4SBC	1	
59.4	Plateau Creek[6]		X		70	R2US1F	2	
66.0	Tate Creek	X		X	120	PFO1A		
69.2	Rapid Creek	X			20	PFO1A		
71.6	Cottonwood Creek	X			20	PFO1A	1	
74.2	Sink Creek	X			15	R4SBC	1	
81.2	Whitewater Creek	X			15	R4SBC	1	
81.2	Whitewater Creek Floodplain			X	30	PSS1A	4	
83.3	Unnamed Creek	X			20	R4SBA	1	
88.0	Kannah Creek	X			20	R4SBA	1	
	Kannah Creek Floodplain			X	50	PSS1C	4	
91.0	Indian Creek	X			20	R4SBA	1	
92.9	Deer Creek	X			20	R4SBA	1	

APPENDIX C-2 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
97.3	Wells Gulch	X			20	R4SBA	1	
103.6	Alkali Creek	X			20	PSS1A	1	
105.4	Gunnison River[6]		X		250	R2UBH	3	
105.0	Gunnison River Riparian Zone			X	2,000	PFO1A	4	1
105.6	Roubideau Creek		X		25	R4SBC	1	
	Roubideau Creek Riparian Zone			X	140	PFO1A	4	
108.1	Cottonwood Creek	X			20	R4SBC	1	
	Cottonwood Creek Riparian Zone			X	50	PFO1A	4	1
110.5	Roubideau Creek		X		25	R4SBC	1	
	Roubideau Creek Riparian Zone				50	PFO1A	4	
117.7	Roatcap Gulch	X			15	R4SBA	1	
119.3	Big Sandy Wash	X			15	PEM2K	1	
137.7	Grays Creek	X			15	PFO1A	1	
140.6	Kelly Creek	X			20	PFO1A	1	
143.5	Sheep Creek[6]		X		15	R4SBA	1	
145.5	Unnamed drainage of Cottonwood Creek	X			15	R4SBA	1	

APPENDIX C-2 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
150.5	San Miguel River Hay Meadows			X	150	PEM2K	4	
151.1	San Miguel River[6]		X		80	R2UB1F	3	
	San Miguel River Riparian Zone			X	70	PFO1A	4	
155.4	Maverick Draw[6]		X		20	R4SBA	1	
155.7	Maverick Draw Hay Meadows			X	150	PEM2K	4	
157.2	Naturita Creek[6]		X		40	R2UBF	1	
	Naturita Creek Riparian Zone			X	160	PSS1A	4	2
159.0	Hamilton Creek	X		X	15	R4SBA/PSS1A	1	
159.1	Grassy Draw	X		X	15	R4SBA/PSS1A	1	
162.4	Broad Canyon	X			15	R4SBA/PEM2A	1	
168.3	Nelson Creek	X			20	R4SBC	1	3
168.5	Dry Creek	X			20	R4SBC	1	3
170.4	Dead Horse Creek	X			20	R4SBC	1	3
173.0	Big Gypsum Creek	X			15	R4SBA	1	3
178.5	Spring Creek	X			15	R4SBA	1	3
186.2	Disappointment Creek				30	R4SBA	1	3
193.2	Ryman Creek				20	R4SBA	1	3

APPENDIX C-2 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
200.3	Summer Camp Creek				20	R4SBA	1	
200.9	Summer Camp Creek				20	R4SBA	1	
201.6	Summer Camp Creek				20	R4SBA	1	
201.8	Plateau Creek[6]		X		20	R2UBF	1	
206.8	Beaver Creek	X			15	R4SBA	1	
211.3	Turkey Creek	X			15	R4SBC/PFO1A	1	
213.2	Boggy Draw	X			15	R4SBC/PFO1A	1	
214.2	House Creek	X			15	R4SBC/PFO1A	1	
215.0	House Creek	X			15	R4SBC/PFO1A	1	
215.4	House Creek	X			15	R4SBC/PFO1A	1	
222.5	Dolores River Hay Meadow			X	1,400	PEM2K	4	
222.6	Dolores River[6,8]		X		100	R30BH	3	
227.0	Lost Canyon Creek		X		30	R2UB1F	1	
227.0	Lost Canyon Creek Riparian Zone			X	400	PSS1A	4	
234.8	Chicken Creek[6,8]		X		30	R2UB1F	1	1
	Chicken Creek Riparian Zone			X	50	PFO1A	4	
237.4	West Mancos River[6,8]		X		50	R2UB1F	2	

APPENDIX C-2 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
237.4	West Mancos River Riparian Zone			X	200	PFO1A	4	1
240.6	Middle Mancos River[6,8]		X		30	R2UB1F	2	
	Middle Mancos River Riparian Zone			X	50	PFO1A	4	1
243.0	East Mancos River[6,8]		X	X	50	R2UB1F/ PFO1A	1,4	1
248.3	Cherry Creek	X			20	R4SBC	1	
249.3	Devils Canyon	X			15	R4SBA	1	
256.1	Alkali Gulch	X			15	R4SBA	1	
	Alkali Gulch Riparian Zone			X	50	PSS1A	4	
256.6	Alkali Gulch	X			15	R4SBA	1	
	Alkali Gulch Riparian Zone			X	100	PSS1A	4	
262.2	La Plata River		X		30	R2UB1H	1	
267.0	La Plata River		X		30	R2UB1H	1	
	La Plata River Hay Meadow			X	700	PEM2K	4	
268.1	La Plata River		X		30	R2UB1H	1	
272.1	La Plata River		X		30	R2UB1H	1	

APPENDIX C-2 (CONTINUED)

Approximate Milepost	Wetland Crossings	Flow Regime			Approximate Length Traversed (feet)	National Wetland Inventory Classification[8]	Crossing Method/ Environmental Protection Measures[4]	Special Protection Measures[5]
		I[1]	P[2]	WL/R[3]				
272.3	La Plata River Riparian Zone			X	1,200	PFO1A	4	1
272.4	La Plata River Hay Meadow			X	800	PEM2K	4	
272.5	La Plata River		X		300	R2UB1H	1	
	La Plata River Riparian Zone				100	PFO1A	4	1
276.2	McDermott Arroyo	X			30	R4SBA	1	
277.5	Jaquez Arroyo	X			20	R4SBA	1	
282.5	Farmington Glade	X			50	R4SBA	1	
290.1	Animas River[7]		X		150	R2UB1H	3	
	Animas River Riparian Zone			X	300	PFO1A	4	1
291.0	Hart Canyon	X			100	R4SBA	1	
293.3	North Knowlton Canyon	X			100	R4SBA	1	

APPENDIX C-2 (CONTINUED)

Footnotes:

[1]I = Intermittent

[2]P = perennial

[3]WL/R = wetland/riparian

[4]Crossing Type:
1 = minor stream crossing
2 = major stream crossing
3 = major river crossing
4 = wetland/riparian area crossing

[5]Special Environmental Protection
1 = Align ROW to avoid loss of mature (>1-foot diameter) cottonwood and aspen trees.
2 = Allgn ROW to avold active beaver ponds or artificial ponds, if present at the crossing.
3 = Apply incised channel setbacks.

[6]Aquatic Life, Class 1, Cold; Colorado - waters that are 1) capable of sustainlng a wide variety of coldwater biota, including sensitive species, or 2) could sustain such biota for correctable water quality.

[7]Cold Water Fishery; New Mexlco

[8]High Quality, Class 2

APPENDIX D

TRANSCOLORADO GAS TRANSMISSION PROJECT
RECOMMENDED REVEGETATION SEED MIX

TABLE D-1

TransColorado Gas Transmission Project - Recommended Revegetation Seed Mix

Vegetation Type	Basic Seed Mix[1]	Recommending Agency	Modifications/Comments (Agency, Mileposts)
Pasture/Agricultural			
Colorado			
Dryland	Paiute Orchardgrass - I,[2] 0.5 lb/acre PLS[3]		
	Regar Meadow Brome - (var.-I), 3 lbs/acre PLS	• SCS-La Plata County • CDOW • USFS-Uncompaghre N.F., Norwood District • BLM - San Juan Resource Area	
	(Fairway) Crested Wheatgrass - I, 1 lbs/acre PLS		
	Jose Tall Wheatgrass - I, 3 lbs/acre PLS		
Irrigated	Orchardgrass (Not Paiute) - I, 1 lbs/acre PLS		
	Regar Meadow Brome - (var.-I), 4.5 lbs/acre PLS		
	Timothy - N, 0.5 lb/acre PLS		
	Meadow Foxtail - MN, 0.5 lb/acre PLS		
New Mexico			
Dryland	Paiute Orchardgrass - I, 3 lbs/ acre PLS		1. 50% Sand Dropseed/50% Blue Grama, 25 lbs/acre PLS (total mix), (SCS - San Juan County), MP = 270.8 - 302.2 (proposed route).
	(Fairway) Crested Wheatgrass - I, 5 lbs/acre PLS	• BLM - Farmington Resource Area	
	Scarlet Globe Mallow - N, 1 lb/acre PLS		

TABLE D-1 (CONTINUED)

Vegetation Type	Basic Seed Mix[1]	Recommending Agency	Modifications/Comments (Agency, Mileposts)
Irrigated	Orchardgrass (not Paiute) - I, 10 lbs/acre PLS Tall Fescue - I, 7 lbs/acre PLS Tall Wheatgrass - I, or Meadow Brome - N, 8 lbs/acre PLS	• SCS - Jan Juan County	1. Reduce total mix PLS to 12 lbs/acre (BLM - Farmington Resource Area) MP = 270.8 - 302.2 (proposed route).
Riparian			
Colorado	Garrison's Creeping Foxtail - N, 2 lbs/acre PLS Western Wheatgrass - N, 3 lbs/acre PLS Streambank Wheatgrass - N, 3.5 lbs/acre PLS Slender Wheatgrass - I, 2 lbs/acre PLS	• SCS - Montezuma/Dolores Counties	1. Replace Western Wheatgrass with 10% Smooth Brome and 10% Timothy (CDOW for SWAs) MP = 104.9 - 108.0, 163.9 - 171.0 (proposed route) 179.7-182.8 (Agency Preferred Route). 2. Replace Western Wheatgrass and Slender Wheatgrass with Pubescent Wheatgrass and Paiute Wheatgrass; may add Reedcanary Grass (SCS - Delta County) MP = 94.1 - 111.0 (proposed route). 3. Replace Slender Wheatgrass with Tall Wheatgrass unless a flooded area; add tree seedlings (BLM - San Juan Resource Area) MP = 159.5 - 255.5 (proposed route).
New Mexico	Tall Wheatgrass - I, 9 lbs/acre PLS Garrison's Creeping Foxtail - N, 8 lbs/acre PLS Western Wheatgrass - N, 8 lbs/acre PLS	• SCS - San Juan County	1. For wetter riparian area use: Orchardgrass - 3 lbs/acre PLS, Timothy - 2 lbs/acre PLS, and Kentucky Bluegrass - 1 lb/acre PLS (BLM - Farmington Resource Area) MP = 270.8 - 302.2 (proposed route).

TABLE D-1 (CONTINUED)

Vegetation Type	Basic Seed Mix[1]	Recommending Agency	Modifications/Comments (Agency, Mileposts)
Saltbush			
	Indian Ricegrass - N, 2.5 lbs/acre PLS Thickspike Wheatgrass - N, 4.5 lbs/acre PLS Galleta - N, 2.5 lbs/acre PLS Sodar Streambank Wheatgrass - N, 2.3 lbs/acre PLS Add Shadscale - 1 lbs/acre PLS	• SCS - Montrose County	1. Add 0.5 lb/acre PLS - Four-wing saltbush (CDOW for Escalante SWA) MP =104.9 - 108.0 (proposed route); and (USFS - Uncompaghre N.F. - Norwood District) MP = 128.6 - 135.9, 137.5 - 144.5, 145.1 - 145.9, 146.2 - 148.0 (proposed route), 175.1-175.3 (Agency Preferred Route). 2. Replace Galleta and Thickspike Wheatgrass with 20% Bulbous Bluegrass, 20% Winterfat, and 20% Luna Pubescent Wheatgrass; add Four-wing Saltbush - 0.5 lb/acre (CDOW for Dry Creek SWA) MP = 163.9 - 171.0 (proposed route). 3. 22% Yellow Sweetclover, 26% Ephraim (Fairway) Crested Wheatgrass, 26% Critana Thickspike Wheatgrass, 27% Sodar Streambank Wheatgrass, 0.5 lb/acre PLS - Four-wing Saltbush, 1 lb/acre PLS - Shadscale (SCS - Delta County) MP = 94.1 - 111.0 (proposed route). 4. 33% Jose Tall Wheatgrass, 34% Alkali Sacaton, 33% Western Wheatgrass, 0.5 lb/acre PLS - Four-Wing Saltbush (SCS - San Miguel County) MP = 159.6 - 182.5 (proposed route), 159.0-179.1 (Agency Preferred Route); and (BLM - San Juan Resource Area) MP = 159.5 - 255.5 (proposed route).

TABLE D-1 (CONTINUED)

Vegetation Type	Basic Seed Mix[1]	Recommending Agency	Modifications/Comments (Agency, Mileposts)
Pinyon-Juniper/ Sagebrush/Grassland			
Colorado	(Fairway) Crested Wheatgrass - I, 2 lbs/acre, PLS Western Wheatgrass- N, 5 lbs/acre PLS Indian Ricegrass - N, 3 lbs/acre PLS Canby Bluegrass - I, 1 lb/acre PLS Add Four-Wing Saltbush - N, 0.5 lb/acre PLS	• SCS - Montezuma/Dolores Counties • SCS - San Miguel County	1. Replace Canby Bluegrass with 20% Russian Wildrye (USFS - Uncompaghre N.F. - Norwood District) MP = 128.6 - 135.9, 137.5 - 144.5, 145.1 - 145.9, 146.2 - 148.0 (proposed route), 175.1 - 175.3 (Agency Preferred Route). 2. Add 1 lb/acre Paiute Orchardgrass (SCS - Garfield County) MP = 16.1 - 42.5 (proposed route), and (SCS - Rio Blanco County) MP = 0 - 16.1 (proposed route). 3. Eliminate Four-wing Saltbush (SCS - La Plata County) MP = 245.4 - 270.8 (proposed route). 4. Eliminate Canby Bluegrass; adjust percentages of others: 34% (Fairway) Crested Wheatgrass, 33% Western Wheatgrass, 33% Indian Ricegrass (SCS - Montrose County) MP = 111.0 - 159.6 (proposed route), 151.7 - 159.0 (Agency Preferred Route). 5. Eliminate Western Wheatgrass and replace with 15% Bulbous Bluegrass, 5% Idaho Fescue, and 10% Yellow Sweetclover (CDOW for SWAS) MP = 104.9 - 108.0, 163.9 - 171.0 (proposed route), 179.7 - 182.8 (Agency Preferred Route). 6. Replace (Fairway) Crested Wheatgrass with Thickspike Wheatgrass (BLM - San Juan Resource Area) MP = 159.5 - 255.5 (proposed route).

TABLE D-1 (CONTINUED)

Vegetation Type	Basic Seed Mix[1]	Recommending Agency	Modifications/Comments (Agency, Mileposts)
New Mexico			
Pinyon-Juniper	Indian Ricegrass - N, 4 lbs/acre PLS (Fairway) Crested Wheatgrass - I, 5 lbs/acre PLS Small Burnet - N, 2 lbs/acre PLS	• BLM - Farmington Resource Area	Replace Small Burnet with Sand Dropseed (SCS - San Juan County) MP = 270.8 - 302.2 (proposed route).
Sagebrush/Grassland	Nordan Crested Wheatgrass - I, 4 lbs/acre PLS Russian Wild Rye - I, 4 lbs/acre PLS Scarlet Globe Mallow - N, 1.5 lbs/acre PLS	• BLM - Farmington Resource Area	1. 40% Galleta, 35% Blue Grama, 25% Luna Pubescent Wheatgrass (SCS - San Juan County) MP = 270.8 - 302.2 (proposed route).
Mountain Shrub	Western Wheatgrass - N, 6 lbs/acre PLS Luna Pubescent Wheatgrass - I, 6 lbs/acre PLS Mountain Brome - N, 4 lbs/acre PLS	• SCS - Montezuma/Dolores Counties • SCS - La Plata County	1. Use Lincoln Smooth Brome in place of Mountain Brome (SCS - Rio Blanco County) MP = 0 - 16.1 (proposed route). 2. 5% Idaho Fescue, 10% Bulbous Bluegrass, 5% Yellow Sweetclover, 40% Luna Pubescent Wheatgrass, 20% Mountain Brome, 5% Indian Ricegrass, 10% Four-wing Saltbush, 5% Mountain Mahogany - 0.5 lb/acre PLS (CDOW - Lone Cone SWA) MP = 179.7 - 182.8 (Agency Preferred Route).

TABLE D-1 (CONTINUED)

Vegetation Type	Basic Seed Mix[1]	Recommending Agency	Modifications/Comments (Agency, Mileposts)
			3. Replace Western Wheatgrass with 5% Idaho Fescue, 10% Bulbous Bluegrass, 5% Yellow Sweetclover (USFS - Uncompaghre N.F. - Norwood District) MP = 128.6 - 135.9, 137.5 - 144.5, 145.1 - 145.9, 146.2 - 148.0 (proposed route) 175.1 - 175.3 (Agency Preferred Route). 4. Add a mountain shrub to the basic mix (BLM - San Juan Resource Area) MP = 159.5 - 255.5 (proposed route).
Conifer - Pine, Conifer - Aspen, and Conifer - Douglas Fir	Arriba Western Wheatgrass - N, 8 lbs/acre PLS Slender Wheatgrass - I, 2 lbs/acre PLS Intermediate Wheatgrass - N, 3 lbs/acre PLS Arizona Fescue - N, 0.5 lb/acre PLS	• SCS - Montezuma/Dolores Counties	1. Replace Western Wheatgrass, Intermediate Wheatgrass, and Arizona Fescue with 30% Mountain Brome, 20% Idaho Fescue, and 30% Timothy (CDOW, Lone Cone SWA) MP = 179.7 - 182.8 (Agency Preferred Route). 2. Specifically for Conifer-Douglas Fir type - 30% Hard Fescue - 1 lb/acre PLS, Kentucky Bluegrass - 0.5 lb/acre PLS, Slender Wheatgrass - 3.5 lbs/acre PLS, Smooth Brome - 2.5 lbs/acre PLS (SCS - Garfield County) MP = 16.1 - 42.5 (proposed route). 3. Specifically for Conifer-Douglas Fir type - 30% Hard Fescue, 20% Orchardgrass, 15% Idaho Fescue, 5% Timothy, 20% Smooth Brome, 10% Slender Wheatgrass (CDOW - for Escalante, Dry Creek, and Lone Cone SWAs) MP = 104.9 - 108.0, 163.9 - 171.0 (proposed route), 179.7 - 182.8 (Agency Preferred Route). 4. Replace some of the Western Wheatgrass with Intermediate Brome and some Fescue (USFS Uncompaghre N.F. - Norwood District) MP = 128.6 - 135.9, 137.5 - 144.5, 145.1 - 145.9, 146.2 - 148.0 (proposed route) 175.1 - 175.3 (Agency Preferred Route).

TABLE D-1 (CONTINUED)

Vegetation Type	Basic Seed Mix[1]	Recommending Agency	Modifications/Comments (Agency, Mileposts)
			5. Replace Western Wheatgrass, Intermediate Wheatgrass, and Arizona Fescue with Mountain Brome - 8.5 lbs/acre PLS, and Timothy - 1 lb/acre PLS, (SCS - Montrose County) MP = 111.0 - 159.6 (proposed route) 151.7 - 159.0 (Agency Preferred Route). 6. BLM - San Juan Resource Area (MP = 159.5 - 255.5 proposed route) preferred No. 5 above; also suggested using Pubescent Wheatgrass instead of Intermediate Wheatgrass, and questioned the use of Arizona Fescue.

[1] All rates are for drilled seed (not broadcast)
[2] I = Introduced, N = Native, MN = Modified Native
[3] PLS = Pure Live Seed

APPENDIX E

THREATENED AND ENDANGERED SPECIES

APPENDIX E-1

Endangered, Threatened, Candidate, and Sensitive Plant and Wildlife Species Potentially Occurring Along the Proposed, Agency Preferred and Variations of the TransColorado Pipeline

Major Group	Common Name	Scientific Name	Status[1]				General Habitat	Route[2] Segments of Potential Occurrence
			Federal	Colorado	New Mexico	Forest Service		
Mammals	Black-footed ferret	Mustela nigripes	E	E	E		No recent sightings, but potential habitat exists in prairie dog towns.	All
	River otter	Lutra canadensis	--	E	--	S	Reintroduced into Gunnison River.	P, MVE, AP, SJV
	North American wolverine	Gulo gulo var. luscus	C2	E	--	S	No recent sightings, but unconfirmed locations have been reported for Colorado. Higher elevation conifer forests.	P, AP, MVE, AV
	Mink	Mustela vision	--	--	E		Riparian habitat on San Juan, La Plata, and Animas Rivers in New Mexico.	All
	North American Lynx	Felis lynx var. canadensis	C2	E	--	S	No recent sightings, but unconfirmed locations have been reported for Colorado. High elevation conifer forests.	P, AP, MVE, AV

APPENDIX E-1 (CONTINUED)

Major Group	Common Name	Scientific Name	Status[1] Federal	Colorado	New Mexico	Forest Service	General Habitat	Route[2] Segments of Potential Occurrence
Birds								
	Peregrine falcon	Falco peregrinus	E	E	E		Resident found along Dolores River, Black Canyon, Navajo Reservoir and Animas River.	All
	Bald eagle	Haliaeetus leucocephalus	E	E	E		Wintering resident along Colorado, Gunnison, San Miguel, Dolores, Animas, and La Plata Rivers, nesting in Durango and Cortez regions.	All
	Whooping crane	Grus americana	E	E	E		Rare fall and spring migrant.	P, AP, GV
	Mexican spotted owl	Strix occidentalis var. lucida	PT	–	–	S	Steep, narrow canyons with rock faces and mixed conifer-forest.	All
	Burrowing owl	Athene cunicularia	I	–	–		Open areas in prairies, sagebrush, flats, pinyon-juniper slopes, and wherever rodent burrows are abundant.	All
	Swainson's Hawk	Buteo swainsoni	3C	–	–		Non-forested lowlands with open foraging areas.	All
	Ferruginous hawk	Buteo regalis	C2	–	–	S	Salt desert shrub, sagebrush, grassland communities.	All
	White-faced ibis	Plegadis chihi	C2	–	–	S	Migrant found along Uncompahgre and Gunnison Rivers.	All
	Long-billed curlew	Numenius americanus	C2	–	–		Salt desert shrub communities and cropland, Uncompahgre Valley and North Fork.	All

APPENDIX E-1 (CONTINUED)

Major Group	Common Name	Scientific Name	Status[1] Federal	Colorado	New Mexico	Forest Service	General Habitat	Route[2] Segments of Potential Occurrence
	Mississippi kite	Ictinia mississippiensis	–	–	E		Riparian habitat on San Juan, La Plata, and Animas Rivers in New Mexico.	P, AP, SJV
	Redheaded woodpecker	Melanerpes erythrocephalus	–	–	E		Riparian habitat on San Juan, La Plata, and Animas Rivers in New Mexico.	All
	Greater sandhill crane	Grus canadensis	–	E	–		Fall and spring migrant.	All
	Mountain plover	Chardrius montanus	C2	–	–	S	Dry grasslands, saltbush, and sagebrush habitats.	All
	Western snowy plover	Charadrius alexandrinus var. nivosus	C2	–	–	S	Shores of alkaline lakes, ponds.	All
	Northern Goshawk	Accipiter gentilis	C2	–	–	S	Coniferous forests.	All
	Southwestern willow flycatcher	Empidomax trailii var. extimus	C2	–	–	S	Riparian zones, known to occur on Gunnison River, Escalante State Wildlife Area	All
	Golden eagle*	Aquila chrysaetos	–	–	–		Occurs over a variety of habitats, generally nests on cliff faces and rock outcrops.	All
Fish								
	Colorado squawfish	Ptychocheilus lucius	E	E	–		Resident in Lower Gunnison and Colorado Rivers.	P, AP, GV

APPENDIX E-1 (CONTINUED)

Major Group	Common Name	Scientific Name	Status[1] Federal	Colorado	New Mexico	Forest Service	General Habitat	Route[2] Segments of Potential Occurrence
	Razorback sucker	Xyrauchen texanus	PE	E	–	S	Occurs below confluence of Colorado River from Debeque, Colorado. Potential habitat in Lower Gunnison below Redland Diversion.	P, AP, GV
	Bonytail chub	Gila elegans	E	E	E		No recent records, but historically occur in Colorado River.	P, AP, GV
	Humpback chub	Gila cypha	E	E	–		Resident in Colorado and Gunnison Rivers near Grand Junction.	P, AP, GV
	Colorado River cutthroat trout	Salmo clarki pleuriticus	C2	–	–	S	Resident in Colorado River.	P, AP, GV
	Roundtail chub	Gila robusta	–	–	E		Potential habitat exists in the San Juan River drainage.	P, AP, SJV
	Mottled sculpin*	Cottus bairdi	–	–	–		Animas River.	P, AP, SJV
Amphibians								
	Boreal western toad	Bufo boreas var. boreas	C2	–	E	S	Marshes, wet meadows, and ponds/stream margins, subalpine.	P, AP
Reptiles								
	Utah milk snake	Lampropeltis triangulum var. taylori	–	S	–		Pinyon-juniper, canyons, grasslands, ponderosa pine, mountain shrub habitats.	All
Plants								

APPENDIX E-1 (CONTINUED)

Major Group	Common Name	Scientific Name	Status[1]				General Habitat	Route[2] Segments of Potential Occurrence
			Federal	Colorado	New Mexico	Forest Service		
	Spineless hedgehog cactus	Echinocereus triglochidiatus var. inermis	E	1	–		Shallow sandstone soil associated with bedrock at or near the surface.	P, AP
	Uinta Basin hookless cactus	Sclerocactus glaucus	T	1	–		Rocky soils.	P, AP, GV
	Mesa Verde cactus	Sclerocactus mesae-verdae	T	1	–		Dry, clay soils at 4,000 to 5,000-foot elevations.	AP, AV, SJV
	Dudley Bluffs twinpod	Physaria obcordata	T	1	–		Barren slopes of weathering oil shale.	P, AP, GV
	Knowlton's cactus	Pediocactus knowltonii	E	1	E		Pinyon-juniper, gravelly soils. Extremely rare and localized.	P, AP, AV
	Mancos milkvetch	Atriplex humillimus	E	1	E		Sand soil pockets in sandstone.	SJV
	Mancos saltbush	Atriplex pleiantha	PE	1	E		Barren clay soils, Mancos shale.	SJV
	Dudley Bluffs bladderpod	Lesquerella congesta	T	1	–		Barren slopes of weathering oil shale.	P, AP, GV
	Clay-loving wild buckwheat	Eriogonum pelinophilum	E	1	–		Barren adobe clay soils, Mancos shale.	P, U
	Beautiful gilia	Gilia formosa	C2	–	E		Badland areas east of Aztec and Bloomfield, NM.	SJV, P, AP, AV
	Delta lomatium	Lomatium concinnum	C2	1	–		Low altitude Mancos shale areas in association with saltbush near Hotchkiss and Montrose.	P, AP
	Adobe beardtongue	Penstemon retrorsus	C2	1	–		Mancos shale outcrops.	P, AP

APPENDIX E-1 (CONTINUED)

Major Group	Common Name	Scientific Name	Status[1] Federal	Status[1] Colorado	Status[1] New Mexico	Forest Service	General Habitat	Route[2] Segments of Potential Occurrence
	De Beque milkvetch	Astragalus debequaeus	C2	1	–		Clay soils, Wasatch Formation	P, AP
	DeBeque phacelia	Phacelia submutica	C1	1	–		Barren clay soils, margins of Colorado River Valley.	P, AP, GV
	San Juan milkweed	Asclepias sanjuanensis	C2	–	S		Eroded sandy soils.	SJV
	Hard wall cactus	Schlerocactus whipplei	–	–	E		Gravelly, sandy ground, associated with pinyon-juniper	P, SJV, AP
	Wetherill milkvetch	Astragalus wetherillii	C2	3	–		Bushy slopes.	SJW
	Weak-stemmed mariposa lily	Calochortus flexuosus	–	2	–		Dry slopes and plains.	SJW
	Hanging garden sullivantia	Sullivantia purpusii	–	4	–		Springs and seeps associated with cliffs and rock outcrops.	P, AP, GV
	Shale columbine	Aquilegia barnebyi	–	4	–		Seeps in Green River Formation	P, AP, GV
	Sun-loving meadowrue	Thalictrum heliophilum	3C	4	–		Decomposing shale, Piceance Basin.	P, AP, GV
	Naturita milkvetch	Astragalus naturitensis	–	2	S		Sandstone ledger, crevices of sandstone.	P, AP, SJV
	Tall cryptantha	Cryptantha elata	–	4	–		Shallow, loamy soils with some rock outcrops	P, AP, GV
	Small flower beardtongue	Penstemon parviflorus	C2	1	–		Near Mancos, Montezuma County.	P, AP, SJV
	Arboles milkvetch	Astragalus oocalycis	–	4	S		Alkaline clay soils on slopes and along arroyos.	P, AP, SJV, AV

APPENDIX E-1 (CONTINUED)

Major Group	Common Name	Scientific Name	Status[1] Federal	Status[1] Colorado	Status[1] New Mexico	Forest Service	General Habitat	Route[2] Segments of Potential Occurrence
	Utah fescue	Festuca dasyclada	3C	4	–		Green River Formation Tulus slopes.	GV, P, AP
	Piceance bladderpod	Lesquerella parviflora	3C	1	–		Barren slopes of weathering oil shale.	GV, P, AP
	Narrowstem gilia	Gilia stenothyrsa	–	2	–		Pinyon-juniper.	P, AP, GV
	Grand buckwheat	Eriogonum contortum	–	4	–		Clayey loam soils on hills	GV
	Cottaim's milkvetch	Astragalus monumentalis var. cottamii	–	–	S		Depressions, and crevices of sandstone rimrock.	SJV, P, AV, AP
	Paradox Valley Cryptantha	Cryptantha paradoxa	–	–	S		Sandy loam soils on hills	SJV
	Scorpionweed	Phacelia splendens	–	–	S		Dry, sandy hills	SJV
	Spiny-leaf milkvetch	Astragalus kentrophyta var. neomexicanus	–	–	S		Gullied bluffs, badlands, dunes, and roadsides.	P, AP, AV, SJV
	Monument Valley milkvetch	Astragalus monumentalis var. monumentalis	–	–	S		Rock cracks, sandy ledges, and slopes among pinyon-juniper.	P, AP, AV, SJV
	Grand Junction milkvetch	Astragalus linifolius	3C	1	–		Canyonsides, E base of Uncompahgre Plateau and Dolores River.	P, AP, GV, MVE
	Deluvium lady's tresses	Spiranthes diluvialis	C1	1	–		Streamsides, wetlands.	
	Bigtooth maple	Acer grandidentatum	–	2	–		North face of Mesa Verde Cliffs.	SJV, AP

APPENDIX E-1 (CONTINUED)

Major Group	Common Name	Scientific Name	Status[1] Federal	Colorado	New Mexico	Forest Service	General Habitat	Route[2] Segments of Potential Occurrence
	Rocky Mountain thistle	Cirsium perplexans	–	2	–		Adobe hills in the Colorado and Gunnison River Valleys.	P, AP, GV
	Nakedstem	Enceliopsis nudicaulis	–	2	–		Mancos shale hills.	P, AP
	Helleborine	Epipactis gigantea	–	2	–		Moist, protected alcoves of sandstone canyon walls, W Counties.	All
	Plateau penstemon	Penstemon scariosus	–	2	–		Pinyon-juniper hills	GV
	Bitterroot	Lewisia rediviva	–	3	–		Gravelly flats and on seasonally wet sagebrush benches Moffatt County.	P, AP
	Paradox breadroot	Pediomelum aromaticum	–	3	–		Adobe hills, Mesa and Montrose Counties.	P, AP
	Large-flowered breadroot	Pediomelum megalanthum	–	3	–		Adobe hills, Mesa and Montrose Counties.	P, AP

APPENDIX E-1 (CONTINUED)

Footnotes:

[1]
- E = Endangered
- T = Threatened
- PE = Proposed-endangered
- PT = Proposed-threatened
- C1 = Federal candidate, Category 1, for federal listing
- C2 = Federal candidate, Category 2, for federal listing
- 3C = Federal candidate, Category 3C for federal listing
  Current information indicates species more widespread than previously thought.
- I = Species of high interest
- S = Sensitive
- * = Species that are not federally listed or state sensitive species but are classified as sensitive species by the Navajo Natural Heritage Program.
- 1 = Federal threatened or endangered plant species and species that are rare throughout their range, including a number of species which only occur in Colorado.
- 2 = Plant species which are rare in Colorado but relatively common elsewhere within their range.
- 3 = Plant species which appear to be rare but for which conclusive information is lacking.
- 4 = Plant species of limited distribution or special interest which appear secure at this time.
- FS = Forest Service Sensitive Species

[2]
- P = Proposed Route
- AV = Animas Valley Route Variation
- AP = Agency Preferred Route
- GV = Grand Valley Route Variation
- MVE = Mancos Valley East Route Variation
- SJV = San Juan Valley Route Variation

APPENDIX F

TRANSCOLORADO GAS TRANSMISSION PROJECT
CULTURAL RESOURCES

APPENDIX F

PROGRAMMATIC AGREEMENT

INTRODUCTION

In order to ensure that the BLM's responsibilities under Section 106 of the NHPA, and implementing regulations, are met, the BLM, ACHP, and the Colorado and New Mexico SHPOs signed a Programmatic Agreement (PA). The San Juan, Grand Mesa, Uncompahgre and Gunnison National Forests, the Southern Ute Indian tribe and TransColorado were concurring parties. The BLM, as lead federal agency and pursuant to the PA, is responsible for Section 106 compliance for all lands, both public and private, affected by the proposed project. This agreement includes guidelines for cultural resources identification and treatment and defines the procedures to be followed to ensure that the BLM fulfills its responsibilities under Section 106 of the NHPA. The execution and implementation of this PA evidences that the BLM has satisfied its Section 106 responsibilities for all individual actions of the project.

SITE VARIABLES

Table 3-5 in the text presents summary data for known cultural resources in and near the Proposed Action and Agency Preferred Alternative ROWs. A brief explanation of variables used in the table is appropriate here, as well as general information about cultural resources in the project area. For comparative purposes, both baseline and affected environment data are included in Table 3-5. Miles of high and medium cultural resource sensitivity areas, as derived from Chandler et al. (1991) for inventoried areas, and presence/absence of geological factors affecting site location, are listed in Tables 2-2 and 2-9. It should be noted that although the researcher had access to maps delineating cultural resource locations, it was necessary because of time constraints to tabulate all entries pertinent to the project at hand as if each were a separate site (see Chandler et al. 1991). For example, if an unnamed but recorded railroad grade intersected the study corridor five times, it was counted as five sites. Much of the disparity between Class I data and the present report is reflected by this barrier.

Variable I is comprised of known recorded sites within the study corridor (0.5 mile to either side of the pipeline center line) in the Proposed Action and Agency Preferred Alternative. Cultural and temporal division of sites may be found in Chandler et al. (1991). Unrecorded sites are listed as Variable 2. Most of these are historic linear sites (trails, roads, railroads) that appear numerous times within the route corridors. Variable 3 includes all recorded sites of a potentially eligible nature that fall within the 1-mile corridor. These sites are combined from three categories: sites that may (1) appear to the field recorder to be eligible, (2) be in need of further data to determine their significance, or (3) be unevaluated for eligibility. Eligible recorded sites within the 1-mile-wide corridor are listed as Variable 4; these are sites that are officially eligible for or are listed on the National Register of Historic Places (NRHP). Variables 5 and 6 list those recorded and unrecorded sites that may be impacted by construction of the pipeline; potentially eligible and eligible recorded sites that may be impacted are listed as Variables 7 and 8.

Variables 9 and 10 relate to recorded and unrecorded traditional cultural properties of Native Americans. Officials were contacted at the Uinta and Ouray Agency, Ft. Duschene, Utah; Hopi

Tribe, Kykotsmovi, Arizona; Navajo Nation, Window Rock, Arizona; Southern Ute Tribe, Ignacio, Colorado; Ute Mountain Ute Agency, Towaoc, Colorado; and Jicarilla Apache Tribe, Dulce, New Mexico. To date, the Navajo and Hopi tribes have contributed information to this effort. Since only general locations of these area are known currently by Class I researchers, a presence/absence indicator is sufficient. It is known that there are no areas within project boundaries of nationwide (i.e., Navajo Nation) significance to the Navajo, although areas of local importance may be present (Susan Chandler 1991).

Until the route is finalized and a Class III (intensive) inventory is performed, specific areas of concern that may be impacted remain unknown. Guidelines for treating the traditional cultural properties of the Navajo may be found in a draft manuscript compiled by the Navajo Nation Historic Preservation Department (n.d.)

The numbers of sites projected to be found within the 75-foot construction ROW are expressed as Variable 11. These figures are derived from various sources, including the amount of ROW previously inventoried and number of sites known. Also calculated are environmental factors such as the presence or absence of the Nacimiento Formation (Variable 12) and of Quaternary soils (Variable 13), which indicates the possibility of buried sites.

Miles of cultural resource sensitivity areas (high, medium) are covered by Variables 14 and 15. These are tabulated from existing data in Chandler et al. (1991). In assessing probability of sites and sensitive areas, the amount of land inventoried in the Proposed Route and alternative areas is compared with the density of known sites in each such area. A rough prediction of sensitive areas is then provided for uninventoried areas of comparable topography, geology, vegetation, and hydrology. High and medium sensitivity areas are outlined by mile in Chandler et al. (1991) and illustrated on 7.5-minute USGS quadrangles. Any areas not highlighted are considered to be of low sensitivity for cultural resources. Prehistoric and historic high sensitivity areas are combined on the map, as are those of medium sensitivity.

Baseline data are indicated by Variables 1, 2, 3, 4, 9, 12, and 13. Those relating to the affected environment (Chapter 4) are represented by Variables 5, 6, 7, 8, 10, 11, 14, and 15.

SIGNIFICANCE CRITERIA

Cultural resource laws and regulations are concerned with "significant" sites and districts. A significant site is one which meets one or more of the criteria for inclusion on the NRHP (36 CFR 60.4). These criteria require that a site, district, building or object possess integrity of location design, setting, materials workmanship, feeling and association in addition to one or more qualities relating to association with important events or persons, embodiment of distinctive architectural, structural, or artistic values, or likelihood to yield important historic or prehistoric data. These criteria apply to sites having local and regional as well as national importance. Possession of physical integrity is a primary criterion for NRHP eligibility. Thus, a significant site is one that has been determined eligible to the NRHP by the Keeper of the Register, one that is eligible as decided by the State Historic Preservation Officer and the lead agency archaeologist, or one that appears eligible as witnessed by the site recorder. Sites that have not been assessed for eligibility must also be treated as if they are eligible until assessment of their status is made.

Prehistoric sites which are generally eligible for NRHP inclusion include (1) intact, complex buried sites; (2) sites exhibiting stratigraphically superimposed occupation records; (3) PaleoIndian and other early man sites; (4) physically intact sites that are highly representative of a particular culture or period of occupation; and (5) unique sites that are physically intact. Prehistoric sites which are generally not eligible consist of (1) isolated artifacts and isolated features such as hearths; (2) surface lithic or ground stone scatters or combinations thereof; and (3) sites that lack physical integrity, regardless of their other characteristics.

Historic sites that are generally eligible for the NRHP include (1) those exhibiting a high degree of physical/structural integrity and which are representative of a particular historic period or ethnic occupation; (2) unique sites that are physically intact; (3) intact sites that are associated with particular historically significant events or persons; and (4) vestiges of historic trails. Generally not eligible historic sites include (1) isolated artifacts; (2) isolated occurrences of industrial, agricultural, or automotive equipment; (3) isolated mining prospect pits; (4) surficial artifact scatters including trash dumps; and (5) homesteads that are not highly intact.

For purposes of significance evaluation, a third category of cultural property has recently been identified in response to the passage in 1978 of the American Indian Religious Freedom Act. This category consists of sites which possess religious significance to contemporary Native Americans. Their cultural, religious, and legal significance is largely a matter of interpretation by the tribes themselves or their legal representatives.

MITIGATION AND LEGAL MANDATES

The term "mitigation" refers to actions that reduce or compensate for the adverse effects to a significant historical property, archaeological property, or traditional property, that result from an undertaking. Several alternatives exist for mitigation of potential adverse impacts to significant cultural resources affected by the proposed activity. The preferred action in nearly all cases is avoidance, since it encourages the continued existence of the resource. Avoidance may involve rerouting the rights-of-way for access roads and the pipeline route, or redesigning of construction or maintenance procedures (e.g., relocation of construction staging areas). Successful implementation of this option may also necessitate long-term protection of the resource through fencing, intentional burial, or patrolling.

In instances where avoidance is not feasible, mitigation will usually consist of some form of data retrieval prior to impact. For prehistoric sites, this may include partial or complete excavation, intensive instrument mapping, controlled surface collection, or some combination thereof (e.g., mapping in conjunction with surface collection). For historic sites, this may include architectural or engineering drawings, intensive photo documentation of structures, archival research, and occasionally, partial or complete excavation of site elements. Mitigation of a site through data retrieval would be directed by a site-specific research design formulated in consultation with the SHPO. Analysis and reporting of data are an integral part of this form of mitigation.

A final mitigative alternative, which is appropriate only for certain historic structures, is removal of the property to a new location. This action requires not only that the structural integrity of the subject property be maintained in the process, but also that any qualities of the original site setting that contribute to the site's significance be maintained or recreated in the new location.

A unique set of mitigative actions must be taken in the event of accidental discovery of cultural resources following completion of Class III inventory and NRHP assessment. Previously unrecorded sites are most likely to be found as a result of surface disturbance and trenching operations. When sites are uncovered during these operations, the area would be marked and procedures to avoid further site damage would be undertaken. Because the TransColorado Gas Transmission Project involves federal land and is a federally licensed project, emergency discovery procedures would be activated under the Archeological and Historic Preservation Act (AHPA) of 1974. TransColorado would immediately inform the Department of Interior's Department Consulting Archaeologist (DCA) of the discovery, who (usually through a representative) would inspect the site within 48 hours of notification and render an assessment of NRHP eligibility. The SHPO would also be notified at the same time, as would the USDA-Forest Service and USDI-Bureau of Land Management if Forest Service or BLM lands were involved. If appropriate, mitigative measures would be specified. The DCA would ordinarily invite the SHPO to participate in assessment and mitigative decisions. TransColorado would comply with the DCA's decisions, and although construction activities need not be halted, all efforts would be taken to prevent further damage to the cultural resource.

The Archaeological, Prehistorical and Historical Resources Act of 1973 (as amended) provides field procedures in the event of the discovery of human remains. The investigators, after having secured an excavation permit, would determine the age and cultural affiliation of the remains, and would notify the respective county coroner if such remains are less than 100 years of age. After determining if the remains hold no forensic significance, the coroner would notify the state archaeologist if the remains are those of a Native American, or the Colorado State Anatomical Board, if they are other than Native American. If the remains are those of an individual more than 100 years of age, the anthropologist would forego notification of the coroner and notify the state archaeologist or the Colorado State Anatomical Board, as above.

RECEIVED
AUG 13 1990
NOV 5 1990
ENSR CORP

PROGRAMMATIC AGREEMENT
AMONG
THE U.S.D.I. BUREAU OF LAND MANAGEMENT, COLORADO
THE U.S.D.A. FOREST SERVICE, SAN JUAN AND GRAND MESA, UNCOMPAHGRE AND GUNNISON NATIONAL FORESTS
SOUTHERN UTE TRIBE
THE COLORADO AND NEW MEXICO STATE HISTORIC PRESERVATION OFFICERS
AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE TRANSCOLORADO GAS TRANSMISSION PROJECT

WHEREAS, the Bureau of Land Management, Montrose District (BLM) proposes to administer, on behalf of the above agencies, the TransColorado Gas Transmission Project, as authorized by 43 CFR Part 2800, and

WHEREAS, the BLM, and its cooperating agencies, has determined that the TransColorado Gas Transmission Project may have an effect on properties included in or eligible for inclusion in the National Register of Historic Places (NRHP) and has consulted with the Advisory Council on Historic Preservation (the Council) and the Colorado and New Mexico Historic Preservation Officers (SHPO) pursuant to Section 800.13 of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act, as amended, (16 U.S.C. Section 470f) [and Section 110(f) of the same Act (16 U.S.C. 470 h-2(f)], and

Whereas, this Agreement covers planning, construction, operation and maintenance of the proposed TransColorado Gas Transmission Pipeline including, but not limited to power and communication transmission systems, compressor stations, staging areas, and access roads. The terms of this Agreement shall be completed prior to Notices to Proceed for Rights-of-Way.

Whereas, unless otherwise defined differently in this agreement all terms are used in accordance with 36 CFR 800.2.

Whereas, the TransColorado Gas Transmission Company (the Applicant), has been invited to participate in consultation and as a signatory to this Agreement,

NOW THEREFORE, the BLM, the Council and the SHPO agree that the proposed project (undertaking) shall be administered in accordance with the followin stipulations to satisfy Section 106 responsibilities for all aspects of the project.

STIPULATIONS

In accordance with existing BLM and Forest Service guidelines for cultural resources (prehistoric and historic), and the Secretary of the Interior's Standards and Guidelines (48 FR 44716-44742) (the Secretary's Standards), the following measures will be carried out:

1. The BLM, in consultation with the cooperating agencies shall ensure tha a Cultural Resource Overview (Class I) of the preferred route, and its alternatives, will be prepared by the applicant. The Overview will address the density, diversity, distribution, and significance of the cultural resources, including traditional Native American values, in accordance with measures outlined in Attachment A. The Applicant will also identify areas needing field inventory.

2. The BLM, SHPO, and cooperating agencies, shall evaluate the Overview, in accordance with 36 CFR Part 800, to determine the nature and extent of field inventory required. The failure of the SHPO to comment within 30 days of receipt of the request shall not preclude the BLM from directing the Applicant to implement the specified field inventory.

3. The BLM will assure that the Applicant completes an on the ground, intensive Inventory (Class III, 100% pedestrian) of approved project areas subject to potential ground disturbance that have not been previously inventoried, or areas where the BLM and SHPO determines the results of previous inventories to be inconclusive or inadequate.

4. BLM will submit the results of the inventory to the SHPO for determinations of eligibility pursuant to 36 CFR 63.4.

5. The Applicant shall submit a comprehensive Treatment Plan, based upon the results of the Class I and III inventory reports, that will address the effects of the proposed project on historic properties. The Plan shall identify all historic properties located within the area of potential effects, the nature of the effects to which each property will be subjected, and the treatment strategies proposed to minimize or mitigate the effects of the project. The BLM shall submit the Plan to the SHPO and Council for review. The SHPO and Council shall comment on the Plan within 30 days of receipt. If either party, SHPO or Council, fails to submit their comments within 30 days of receipt, the BLM shall implement the Plan. If the SHPO, or Council, objects to the plan or any part thereof, the BLM will consult with the objecting party to resolve the objection in accordance with stipulation 12.

6. The BLM shall ensure that all records and materials resulting from identification and data recovery efforts are curated in accordance with 36 CFR Part 79, provided that all materials to be returned to their owners will be maintained in accordance with 36 CFR Part 79 until their analysis is complete and they are returned.

7. All work undertaken to satisfy the terms of this Agreement shall meet the Secretary of the Interior's Standards & Guidelines for Archaeology & Historic Preservation (48 FR 44176-44739) and the Council's Treatment of Archaeological Properties Handbook, November 1980.

8. Should previously unidentified historic properties be discovered during construction, the BLM shall ensure that all work that may affect the property is halted until BLM has satisfied the requirements of 36 CFR Part 800.11. The Applicant shall be responsible for alerting the BLM to the discovery of previously unidentified properties and for ensuring that work crews are informed of the requirement to identify, report and protect any such finds.

9. The BLM shall ensure that any human remains encountered during the course of this project are treated in a respectful manner. Where Native American human remains are encountered on Federal Lands the BLM will consult with the signatories to this agreement and attempt to identify affiliated groups for determining treatment and disposition measures consistent with the Council's burial policy. Where Native American human remains are encountered on state or private lands the BLM will consult with the signatories and appropriate interested persons in accordance with state laws.

10. The BLM will coordinate all actions required under this agreement. The Montrose District will be the overall coordinator and Federal contact with the SHPOs. The Applicant may be called upon to facilitate coordination with Native American groups, SHPO, etc, or distribute information or reports to reviewers.

11. The Council and the SHPO may monitor activities carried out pursuant to this Agreement, and the Council will review such activities if so requested. The BLM will cooperate with the Council and the SHPO in carrying out their monitoring and review responsibilities.

12. Should any party of this agreement object within 30 days to any actions pursuant to this agreement, the BLM shall consult with the objecting party to resolve the objection. If the BLM determines that the objection cannot be resolved the BLM shall forward all documentation relevant to the dispute to the Council. Within 30 days after receipt of all pertinent documentation, the Council will either:

1. provide the BLM with recommendations, which the BLM will take into account in reaching a final decision regarding the dispute; or

2. notify the BLM that it will comment pursuant to 36 CFR 800.6(b), and proceed to comment. Any Council comment provided in response to such a request will be taken into account by the BLM in accordance with 36 CFR 800.6(c)(2) with reference to the subject of dispute.

Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; the BLM's responsibility to carry out all actions under this agreement that are not the subject of the dispute will remain unchanged.

13. Any party to this Agreement may request that it be amended, whereupon the parties will consult in accordance with 36 CFR Part 800.13 to consider such amendment.

14. Any party to this Agreement may terminate it by providing thirty (30) days written notice, in writing, to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of a termination, the BLM will comply with 36 CFR Part 800.4 through 800.6 with regard to individual actions covered by this Agreement.

15. In the event that BLM does not carry out the terms of this Agreement, the BLM will comply with 36 CFR Part 800.4 through 800.6 with regard to individual actions covered by this Agreement.

Execution and implementation of this Agreement evidences that the BLM has satisfied its Section 106 responsibilities for all individual actions of the project.

BUREAU OF LAND MANAGEMENT
BY: Glenn E. Keating Date: 7-12-90
Title: Montrose District Manager

ADVISORY COUNCIL ON HISTORIC PRESERVATION
BY: John W. Fowler Date: 9/19/90
Title: Dep. Executive Director

COLORADO STATE HISTORIC PRESERVATION OFFICER
BY: _____ Date: July 18, 1990
Title: Deputy

NEW MEXICO STATE HISTORIC PRESERVATION OFFICER
BY: _____ Date: August 13 1990
Title:

CONCURRANCE:

SAN JUAN NATIONAL FOREST
BY: William R Sefton Date: 10/4/90
Title:

GRAND MESA, UNCOMPAHGRE AND GUNNISON NATIONAL FORESTS
BY: _____ Date: 10-2-90
Title: Forest Supervisor

SOUTHERN UTE TRIBE
BY: _____ Date: _____
Title:

TRANS COLORADO TRANSMISSION COMPANY
Concur:
BY: _____ Date: 10-24-90
Title: Project Mgr

Standards for Overviews.

A. General Standards.

1. The overview shall consist of a comprehensive narrative of th prehistory and history of the study area based on a compilation and analysis of relevant existing information from the appropriate discipline. In addition to cultural resource disciplines, such as archaeology, ethnography, and history, it shall consider environmental information pertinent to human use and occupation of the study area.

2. The overview shall take into account regional overviews (Clas I inventories), State plans and contexts (including Colorado's RP-3 contexts), and Federal, State or local land use plans.

3. The overview shall define types of known and expected cultural properties in the study area and shall describe the bases for these definitions.

4. To the extent the data will allow, the overview shall descrit the nature, distribution and density of each property type in the study area.

5. The overview shall evaluate the quality of, and assess the limitations of, existing archaeological, historical, ethnographic and architectural data and data sources. This analysis should identify stated or implicit biases and assumptions in research orientations, observations, and discriptions.

6. Native American consultation requirements shall be developed as an aspect of the overview document as specified by the BLM in consultation with the respective SHPOs.

7. The overview shall provide, in tabular form and on maps, thos areas which have received sufficient inventory to determine whether the cultural resources qualify for inclusion on the National Register of Historic Places.

B. Property Types with Scientific Values.

1. The overview shall identify previous research questions and evaluate their current relevance. It shall also define new, potential research questions which may be addressed in the study areas.

2. Research priorities shall be set forth in the overview and must be relevant to the specific locations to be investigated.

3. The overview shall identify gaps in the existing data which are important to answering the stated research questions.

4. The overview shall identify property types likely to be found and shall describe the kinds of data they may contain that are relevant to the stated research questions.

5. The overview shall assess geographic areas likely to contain buried cultural resources.

C. Property Types with Other than Scientific Values

The overview shall attempt to identify Native American tribes or groups that may have an historically demonstrable traditional or religious interest in a study area and the places or resources of interest to such groups.

II. Standards for Inventory.

A. General Standards.

1. The BLM will assure that the Applicant completes a 100% pedestrian, on the ground, intensive inventory of the approved project areas subject to potential ground disturbance that have not been previously inventoried, or areas where the BLM and SHPO determine that the results of previous inventories are inconclusive or inadequate. The inventory shall include a 200 foot corridor centered on the construction right-of-way. The Applicant may choose to inventory a wider corridor in some or all areas to enhance the potential for avoidance of cultural properties. The survey interval shall be no greater than 15 meters between transects. The Right-of-Way centerline must be flagged prior to inventory. All facilities requiring Federal authorization and/or all land surfaces that will be disturbed by construction or used in construction shall be inventoried to the same standard as above, including a 100 foot buffer zone.

2. Where cultural resources are encountered during the survey, the inventory area shall be expanded as necessary to fully delineate the boundaries and evaluate the site. All sites will be evaluated in accordance with the criteria for determining National Register eligibility (36 CFR Part 60.4).

3. All cultural resources shall be recorded on site forms acceptable to each SHPO.

4. All previously recorded sites that occur within the construction right-of-way or other areas that will be impacted shall be re-evaluated and the site forms updated as necessary. Sites previously determined ineligible for nomination to the NRHP in formal consultation with the appropriate SHPO, shall not be rechecked.

B. Standards for Inventory Reports.

1. The Applicant shall submit a Class III inventory, interim report. The time frames are to be stipulated in the contract. This report shall be descriptive in nature providing locational and NRHP significance information. A narrative shall also display and discuss the quality and utility of the data of areas inventoried and the relationships of sites to the project area. The report shall also include detailed maps showing areas inventoried and relationships of sites to the project area. Ten (10) copies are to be submitted to BLM for distribution.

C. The final Class III report will include and address the draft report comments. The report shall meet the Secretary of Interior's (48 FR 44728-44737,. BLM and/or SHPO standards. Ten (10) copies will be submitted for BLM distribution. One (1) copy will be camera ready, unbound, and single spaced with original black and white photographs.

III. Guidelines for Treatment.

A. General.

1. The treatment plans will conform to the Secretary of Interior's, Standards & Guidelines for Archaeology & Historic Preservation (48 FR 44728-44738). Treatment recommendations should be cost-effective and realistic, and commensurate with the nature and significance of the involved cultural resources. Recommendations should consider project time schedules and should consider a range of alternative treatments including protection measures and data recovery. Recommendations shall include measures for site monitoring in areas of suspected subsurface values.

If human remains are encountered they will be treated in a respectful manner. Human remains encountered on Federal Lands will be treated in accordance with affiliated tribal desires. Human remains found on state or private lands will be appropriately treated in accordance with state laws.

B. Standards for the Treatment Plan.

1. Data Recovery Plan Standards. The data recovery plan shall conform to the Secretary's Standards and should provide the context and justification for and a detailed description of the proposed data recovery work.

2. Protection Measures.

a. Recommendations for physical or administrative protection measures must consider the nature and source of deterioration of the properties.

b. If physical or administrative protection measures are recommended, proposals must include a feasibility study justification and project specifications.

C. Standards for Data Recovery Reports.

1. The results of data recovery activities shall be documented in a report meeting acceptable Secretary of Interior's Standards.

2. Data recovery reports shall include at a minimum:

a. the property, properties, or portions of properties where data recovery is to be carried out;

b. any property, properties, or portions of properties that will be destroyed, altered, or transferred without data recovery;

c. the research questions to be addressed through the data recovery, with an explanation of their relevance and importance;

d. the methods to be used, with an explanation of their relevance to the research questions;

e. the methods to be used in analysis, data management, and dissemination of data, including a schedule;

f. the proposed disposition of recovered materials and records including the disposition of Native American sacred items, human remains and grave goods;

g. proposed methods for involving the interested public in data recovery;

h. proposed methods for disseminating results of the work to the interested public;

i. proposed methods by which relevant Native American groups and local governments will be kept informed of the work and afforded an opportunity to participate;

j. a proposed schedule for the submission of progress reports to the BLM na coóperating agencies.

D. Draft Report.

1. The Applicant is to submit the draft data recovery report to the BLM following completion of all treatment.

2. The BLM will provide copies to the SHPO's, Council, and cooperating agencies for review and comment.

E. Final Report.

1. The Applicant shall submit a final report to BLM for distribution, including all appendices discussed above.

IV. Standards for Permits.

A. General Standards.

1. Each cultural resource contractor performing work on public, tribal, and state lands must have appropriate cultural resources permits.

APPENDIX G

TRANSCOLORADO GAS TRANSMISSION PROJECT
VISUAL RESOURCES

APPENDIX G

TransColorado Gas Transmission Project
Visual Resources

INTRODUCTION

This appendix presents detailed information on visual resource management objectives by describing the BLM and Forest Service methodology. Table G-1 provides a summary of sensitive viewpoints and visual management classification within the area of review.

EXISTING ENVIRONMENT

Study Process

A significant portion of the lands potentially affected by the proposed project are managed by either the Bureau of Land Management (BLM) or U.S. Forest Service. Both agencies have established programs for the inventory, classification and management of lands for visual resource values. Although somewhat different in procedural application, the basic concepts and objectives of these two programs are virtually identical. In each system, the inventory results provide the basis to identify visual resource management objectives which prescribe acceptable levels of visual modification appropriate to the landscape and viewer sensitivities which occur there. Under the BLM system, these are identified as visual resource management (VRM) classes; while under the Forest Service system, they are identified as visual quality objectives (VQO). Comparable classifications of the two systems are shown below.

BLM VRM Classes	Forest Service Visual Quality Objectives
Class I Objectives:	Preservation:
The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity.	This visual quality objective allows ecological changes only. Management activities, except for very low visual impact recreational facilities, are prohibited.

Class II Objective:

The objective of this class is to retain the existing character of the landscape. Management activities may be seen, but should not attract the attention of the casual observer.

Retention (R):

This visual quality objective provides for management activities which are not *visually evident*.

Class III Objective:

The objective of this class is to partially retain the existing character of the landscape. Management activities may attract attention but should not dominate the view of the casual observer.

Partial Retention (PR):

Management activities remain *visually subordinate* to the characteristic landscape when managed according to the partial retention visual quality objective.

Class IV Objective:

The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Modification (M):

Under modification visual quality objective management activities may visually dominate the original characteristic landscape. However, activities of vegetation and land form alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that visual characteristics are those of natural occurrences within the surrounding area of character type. Additional parts of these activities such as structures, roads, etc., must remain visually subordinate to the proposed composition.

These management class and VQO designations are the baseline standards against which proposed landscape modifications are judged and impact levels established. In order to have a common basis to evaluate and compare all alternatives for the Trans Colorado Pipeline project, it was necessary to establish comparable classifications for all lands potentially affected by the proposed project, including private and Indian lands. This was accomplished using the same inventory considerations used by the BLM and Forest Service systems. These include an inventory of the landscape character and quality, the sensitivity of viewers and the distance relationships of the viewer and the landscape in view. Because most of the private and Indian lands have a character more closely in line with that of BLM lands on the West Slope, the BLM criteria were used more extensively than the Forest Service criteria in establishing these final management classifications for private and Indian lands.

It should be noted that although BLM and Forest Service classifications were assigned to private and Indian lands as a comparative baseline indication of visual values, it is recognized that these classifications have no management implications here as they do on their respective agency lands.

Results

Landscape conditions throughout the study area are highly diverse and generally very scenic. Within the Colorado Plateaus Province, three subdivisions are present in the study area: The Uinta Basin, Canyon Lands and Navajo Sections. This diversity manifests itself in a number of distinct landscape character types within close proximity, including badlands; agricultural valleys; high, rolling plateaus; dramatic, rocky escarpments; pinyon-juniper foothills; dense, forested mountains; and scenic river canyons.

While remote by most standards, this area contains a number of major highways and secondary roads and trails, as well as numerous communities and scattered rural residences. Two highways in the study area have been designated as part of the San Juan Skyway. These are Highway 160 between Durango and Cortez, and Highway 145 between Cortez and Telluride.

In areas where ready public access is available to highly scenic landscapes, or where public sensitivity for landscape values is know to be high, higher visual management standards have been designated.

Figure 3-8 shows VRM/VQO designations for lands along the system of alternative routes. Table G-1 highlights conditions of those areas designated as Retention/Class II and Partial Retention/Class III as well as major sensitive viewpoints, generally from north to south in the study area.

IMPACT ANALYSIS

Process Overview

Figure G-1 illustrates the basic steps involved in the impact analysis process. This process was designed to incorporate the essence of the BLM and Forest Service impact analysis procedures into a single comprehensive approach. As this figure illustrates, visual contrast levels are compared against the visual management objectives for an area (established through the baseline inventory) to determine the level of visual impact.

Visual contrast is an indication of the level of visible change in the landscape brought about by construction and operation of a project. Three variables are considered in determining visual contrast levels: the project description, the inherent character and sensitivity of the landscape

to change (physical contrast), and the degree to which this change is seen by viewers at sensitive viewpoints (visibility). For purposes of this study, all residential, recreation and roadway viewpoints were considered sensitive viewing locations.

This process, therefore, incorporates a project-specific visual absorption capability (VAC) analysis (Forest Service procedure) and a visual contrast rating analysis (BLM impact process). In order to assure that the impact analysis of some 730 miles of alternative routes with highly varied landscape and viewing conditions was both systematic and consistent in its application, a series of detailed criteria were established for classifying landform, vegetation and structure conditions. These criteria included conditions of landform complexity, slope, prominence and color, as well as vegetative type, height, density, complexity and recoverability. These criteria were applied to all alternative routes based on extensive field analysis. In addition, adjacent existing modifications were inventoried and classified according to the Forest Service existing visual conditions (EVC) criteria. Similarly, detailed visibility criteria, such as distance, duration, orientation, screening, position, etc., were developed and inventoried in the field. In all, 33 man-days were spent in the field collecting and carefully documenting these landscape viewing conditions. This documentation included special written field forms, map notes and over 1,200 carefully recorded photographs.

Using a matrix approach to assure consistency of application, the landscape conditions data (which identified the expected levels of on-site physical disturbance) were compared against the visibility conditions along the alternative routes (as shown in Figure G-1) to determine the existing levels of visible change or visual contrast. Similarly, a matrix approach was used as the basis to compare these visual contrast levels to the established visual management objectives to consistently determine impact levels.

Impact levels were judged to be high where the level of visual contrast was determined to exceed the management objectives for an area. Impacts were judged to be moderate where the level of visual contrast would be fully at the limits of the management objectives, and low where the expected contrast would be clearly within the limits of the management objectives.

Two additional steps are identified as part of the impact assessment process shown on Figure G-1. The first, an optional step, involves the preparation of selected visual simulations to accompany the technical analysis as a means of accurately conveying to the general public the extent of expected visual modifications at key sensitive sites. The final task is the development of mitigation measures for reducing levels of unacceptable visual contrast. Because of the extensive body of site-specific data gathered for this analysis, it is possible to identify the specific conditions contributing most to the impact at any given location. With this knowledge, it is possible to develop mitigation measures which are focused and most effective in reducing visual contrast and, therefore, visual impacts.

In order of the general level of effectiveness at reducing visual contrast, the following broad concepts should be considered in this order:

1. Prevent or reduce visible disturbance through careful siting, variation in standard construction practices, or taking advantage of screening.

2. Repeat the form, line, color and texture of nearby, naturally occurring elements in the landscape in facility design and implementation techniques.

Successful revegetation, using indigenous species, is a measure which should be utilized throughout the study area and will not be mentioned under the specific impact/mitigation discussions to follow.

Areas of high visual impact will, by definition, require substantive mitigation to reduce visual contrast to acceptable levels. Because of the harsh climatic and landscape conditions present within the study area, it will not always be possible to find feasible, cost-effective measures that will reduce impacts to acceptable levels. Areas of moderate impact are an indication that extra sensitivity is required to keep disturbance to a minimum, but these are areas where few special measures would be needed to keep visual impacts at an acceptable level. Areas of low visual impact indicate areas wherein standard, good practice techniques of construction are acceptable.

For the visual resource analysis, a general period of 2 to 3 years following construction was used as the basis for the impact ratings. Field analysis conducted throughout the study area indicated that visual improvement beyond this period was minimal for most areas. As a result, the impact levels described herein represent both short- (less than 5 years) and long-term (more than 5 years) impacts.

ADDITIONAL ANCILLARY FACILITIES
VISUAL RESOURCE ANALYSIS
IMPACT RESULTS

Piceance Creek Compressor Station -- A compressor station located in this area would result in high visual impacts primarily due to the high management designation (VRM Class II) and open visibility.

Metering Station, Alternative A Near Mile Post 1.0 -- This metering station would result in high visual impacts due to the VRM Class II management designation and open visibility.

Pipeline, Alternative A Along Roan Creek North of DeBeque -- Within the VRM Class II area (which includes the northernmost 1 1/4 miles), visual impacts would be moderate. Elsewhere, impacts would be low.

Expansion of the Roan Creek Compressor Station -- Visual impacts would be low due to the low visibility of this area from any sensitive viewpoint and the presence of the existing facility.

DeBeque Metering Station -- The DeBeque metering station would result in moderate impact levels (despite its proximity to I-70 and homes) due to the VRM Class III designation for this area and the confined nature of the modification.

Pipeline, New DeBeque Area Segment -- Visual impacts would be low overall, except for a short segment (1/4 mile) near Little Horsethief Creek where the alignment crosses a minor rise through native vegetation. The pipeline through flat, agricultural land elsewhere would result in low impacts.

DeBeque Compressor Station -- A compressor station at this location would result in high visual impacts because of its size and character in close proximity to I-70.

Mailbox Park Compressor and Metering Station -- The visual impacts of this facility would be low due to the low visibility and VRM Class IV designation.

Big Gypsum Metering Station -- The Big Gypsum metering station would result in low visual impacts because of its low visibility and VRM Class IV designation.

TABLE G-1

Summary of Sensitive Observation Points Visual Management Classifications within the Study Area

Area	VRM/VQO Designation	Viewpoints	Landscape Conditions
Piceance Creek	II	County road	Narrow agricultural valley
Roan Cliffs	II	County road & rural residences	2,000' escarpment
Big Salt Wash	III	Recreation road & rural residences	Narrow valley in Book Cliffs
Roan Creek Drainage	III	County road & rural residences	Narrow agricultural valley
Debeque	III	I-70, & rural residences	Open agricultural valley, Colorado River
Sand Wash (near Black Mountain)	III	County road & rural residences	Pinyon-juniper foothills
Indian Peak	II	County road	Unique rock formations
Plateau Creek	III	State Hwy. 65 & rural residences	Narrow creek valley
Grand Mesa	III	Major highway & urban viewpoints in Grand Valley	Steep pinyon-juniper slopes
Clifton	III	I-70, Hwy. 50, many residences	Orchards, urban fringe, Colorado River
Kannah Creek	III	County road & rural residences	Narrow Creek valley
Adobes (north of Delta)	III	Highway 50	Badland character
Roubideau Creek	II	Rural residences	Deep (150-200'), narrow drainage
Uncompahgre Plateau Footslopes	III	BLM & FS access road & rural residences	Arid ridge-drainage complex
Uncompahgre Plateau	PR	FS access road	Forested mountain slopes
San Miguel Canyon	II	State Hwy. 145 & FS/BLM access roads	Deep (800-1000') river canyon

TABLE G-1 (CONTINUED)

Area	VRM/VQO Designation	Viewpoints	Landscape Conditions
Redvale	III	Redvale, State Hwy. 145	Mesa, minor canyon
Dry Creek Basin & Disappointment Valley	III	State Hwy. 141 & BLM access roads	Arid basin w/pinyon-juniper divides
Glade Mountain	PR	FS access roads	Pinyon & ponderosa slopes
Norwood	III	Norwood, Hwy. 145, county roads & rural residences	Agricultural mesa
South of Norwood-Belmear Mountain	III	BLM access road & rural residences	Steep to rolling pine, oak, meadow land
Beaver Creek/Boggy Draw (north of Dolores)	R & PR	Various FS access roads	Rolling pine woodland
Dolores River Canyon	III & R	Dolores, State Hwy. 145 (scenic byway) & rural residences	Moderately deep (400-800') river canyon crossings
Haycamp Mesa	PR	Various FS access roads	Rolling pine woodland
Rampart Hills	R	Jackson Gulch Reservoir & FS access roads	Steep pine woodland
Weber Reservoir-East Mancos River	PR	Various FS access roads	Pine-oak woodland
Upper Mancos Valley	PR & III	Rural residences, State Hwy. 184 & county roads	Primarily pine woodland
Lower Mancos Valley	R & II	Numerous residences, Mancos, State Hwy. 160 (scenic byway), State Hwy. 184 & county roads	Pine woodland agricultural mosaic
Totten Reservoir	III	State Hwy. 160 (scenic byway) & rural residences	Agricultural valley w/pinyon foothills

TABLE G-1 (CONTINUED)

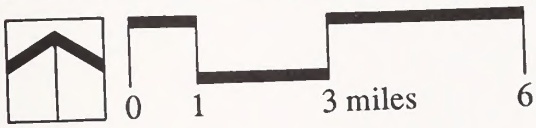
Area	VRM/VQO Designation	Viewpoints	Landscape Conditions
Upper Thompson Park	II	State Hwy. 160 (scenic byway), rural residences & county road	Pinyon-oak brush foothills, agricultural valley
Lower Thompson Park	III	Rural residences & county road	Steep pine slopes, narrow valley
Hesperus West	R & II	State Hwy. 160 (scenic byway) & rural residences	Open pine-oak woodland
Animas River (near Durango)	III	US Hwy. 550, county roads & rural residences	Pinyon-juniper, river bluffs, agriculture, Animas River
Redmesa	III	State Hwy. 140 & rural residences	LaPlata River Valley, agriculture riparian
LaPlata-Aztec, New Mexico	III	BLM access roads, oil field roads, US Hwy. 550 & nearby residences	Rolling pinyon-juniper & sage hills
Northeast of Shiprock	III	Rural residence	Open sagebrush
Waterflow	II	US Hwy. 550, rural residences & county roads	Open sagebrush

TD 195 .P5 T736 1991
U. S. Bureau of Land
Management. Montrose
TransColorado gas
transmission project,

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

LAND OWNERSHIP AND MANAGEMENT STATUS

1 of 3



Bureau of Land Management

National Forest

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

Above Ground Facilities	TransCo Proposed Route	Agency Preferred Route	Grand Valley Variation
1. Piceance Creek Compressor Station (Questar)	□	□	
2. Big Hole Meter Station (Questar)	▽	▽	
3. Meeker Compressor Site & Meeker Meter Station (WestGas)	□▽	□▽	
4. Alternate DeBeque Meter Site (Rocky Mountain)			▽
5. Expansion of Existing DeBeque Compressor Station and Associated DeBeque Meter Station (Rocky Mountain Natural Gas Co.)	■▽	■▽	■▽
6. DeBeque Compressor Site (WestGas)	□	□	
7. DeBeque Meter Station (WestGas)	▽	▽	

- ■ Existing Compressor Station
- □ TransColorado Proposed/Agency Preferred Compressor Station
- ⊠ Possible TransColorado Proposed/Agency Preferred Compressor Station
- ⊟ TransColorado Proposed Compressor Station
- ⊟ Agency Preferred Compressor Station
- ⊞ Possible Agency Preferred Compressor Station
- ▽ Meter Station

1. Piceance Creek Compressor Station (Questar)
2. Big Hole Meter Station (Questar)
3. Meeker Compressor Site & Meeker Meter Station (WestGas)
4. Alternate DeBeque Meter Site (Rocky Mountain)
5. Expansion of Existing DeBeque Compressor Station and Associated DeBeque Meter Station (Rocky Mountain Natural Gas Co.)
6. DeBeque Compressor Site (WestGas)
7. DeBeque Meter Station (WestGas)

Grand Valley Variation

R102W R101W R100W R99W R98W R97W R96W R95W R94W R93W

T1S T2S T3S T4S T5S T6S T7S T8S T9S T5S T6S T7S T8S T9S

0P 0A 10P 10A 20P 20A 30P 30A 40P 40A 50A 0V 10V 20V 30V

Rio Blanco Co.
Garfield Co.
Garfield Co.
Mesa Co.
Garfield Co.
Mesa Co.

BLM White River Resource Area
DISTRICT
BLM GRAND JUNCTION DISTRICT
BLM CRAIG
BLM Grand Junction Resource Area
DE BEQUE
Colorado River
White River

LAND OWNERSHIP AND MANAGEMENT STATUS

1 of 3

0 1 3 miles 6

- Bureau of Land Management
- National Forest
- State
- Indian
- National Park/Monument
- Private
- BLM District Boundary
- BLM Resource Area Boundary
- Indian Reservation Boundary
- Proposed Route
- Agency Preferred Route
- Route Variation
- 50P Proposed Route Mile Post
- 50A Agency Preferred Mile Post
- 50V Route Variation Mile Post

TRANSCOLORADO GAS TRANSMISSION PROJECT

4. Alternate DeBeque Meter Site (Rocky Mountain)

5. Expansion of Existing DeBeque Compressor Station and Associated DeBeque Meter Station (Rocky Mountain Natural Gas Co.)

Compressor Station Interconnect Pipeline

6. DeBeque Compressor Site (WestGas)

7. DeBeque Meter Station (WestGas)

DE BEQUE

50A

50P

White River National Forest

Grand Mesa N.F.

60P

60A

50V

40V

60V

70P

70A

Palisade Watershed

BLM Grand Junction Resource Area

PALISADE

GRAND JUNCTION

Colorado River

Grand Mesa National Forest

80P

80A

WHITEWATER

70V

90P

90A

BLM GRAND JUNCTION DISTRICT

See Sheet 2 of 3

Matching

BLM MONTROSE DISTRICT

DELTA

Mesa Co.

Delta Co.

Montrose Co.

R102W R101W R100W R99W R98W R97W R96W R95W R94W R93W

R3W R2W R1W R1E R2E R3E

R17W R16W R15W R14W R13W R12W R11W R10W R9W R8W

T1S T2S T3S T4S T5S T1N T2N T5N

Above Ground Facilities	TransCo Proposed Route	Agency Preferred Route	Grand Valley Variation
8. Olathe Compressor Station (TransColorado)	☐	☐	
9. Maverick Compressor Station & Associated Meter Station (Rocky Mountain)		◫▽	
10 Big Gypsum Compressor Site & Associated Meter Station (Rocky Mountain)	⊟▽		
11. Dolores Compressor Station Alternate Site #1 (TransColorado)	☒	☒	

- ■ Existing Compressor Station
- ☐ TransColorado Proposed/Agency Preferred Compressor Station
- ☒ Possible TransColorado Proposed/Agency Preferred Compressor Station
- ⊟ TransColorado Proposed Compressor Station
- ◫ Agency Preferred Compressor Station
- ⊞ Possible Agency Preferred Compressor Station
- ▽ Meter Station

8. Olathe Compressor Station (TransColorado)

LAND OWNERSHIP AND MANAGEMENT STATUS

2 of 3

0 1 3 miles 6

- Bureau of Land Management
- National Forest
- State
- Indian
- National Park/Monument
- Private

- BLM District Boundary
- BLM Resource Area Boundary
- ..... Indian Reservation Boundary
- —— Proposed Route
- – – Agency Preferred Route
- —·— Route Variation
- 120P Proposed Route Mile Post
- 120A Agency Preferred Mile Post
- 50V Route Variation Mile Post

TRANSCOLORADO GAS TRANSMISSION PROJECT

NUCLA

BLM Uncompahgre Resource Area

150P

150A

10. Big Gypsum Compressor Site & Associated Meter Station (Rocky Mountain)

9. Maverick Compressor Station & Associated Meter Station (Rocky Mountain)

REDVALE

Montrose Co.
San Miguel Co.

Montrose Co.
San Miguel Co.

160P

160A

NORWOOD

Ouray Co.

San Miguel River

BLM Uncompahgre Resource Area

BLM San Juan Resource Area

Uncompahgre National Forest

170P

170A

TELLURIDE

180P

Uncompahgre National Forest

180A

San Juan National Forest

Lone Cone State Wildlife Area

Ouray Co.
San Juan Co.

San Miguel Co.
Dolores Co.

San Miguel Co.
Dolores Co.

190P

San Juan National Forest

Ryman Creek Watershed

190A

200P

San Juan National Forest

BLM San Juan
BLM MONTROSE DISTRICT Resource Area

11. Dolores Compressor Station Alternate Site #1 (TransColorado)

Dolores Co.
Montezuma Co.

Dolores Co.
Montezuma Co.

San Juan Co.
La Plata Co.

B — Matchline — B

See Sheet 3 of 3

T46N T45N T44N T43N T42N T41N T40N T39N

R17W R16W R15W R14W R13W R12W R11W R10W R9W R8W R7W

Above Ground Facilities	TransCo Proposed Route	Agency Preferred Route	Grand Valley Variation
12. Dolores Compressor Station Alternate Site #2 (TransColorado)	☒	☒	
13. Dolores Compressor Station TransColorado (TransColorado)		⊞	
14. Blanco Meter Station	▽	▽	

- ■ Existing Compressor Station
- □ TransColorado Proposed/Agency Preferred Compressor Station
- ☒ Possible TransColorado Proposed/Agency Preferred Compressor Station
- ⊟ TransColorado Proposed Compressor Station
- ▯ Agency Preferred Compressor Station
- ⊞ Possible Agency Preferred Compressor Station
- ▽ Meter Station

LAND OWNERSHIP AND MANAGEMENT STATUS

3 of 3

0 1 3 miles 6

- Bureau of Land Management
- National Forest
- State
- Indian
- National Park/Monument
- Private
- BLM District Boundary
- BLM Resource Area Boundary
- Indian Reservation Boundary
- Proposed Route
- Agency Preferred Route
- Route Variation
- 260P Proposed Route Mile Post
- 260A Agency Preferred Mile Post
- 50V Route Variation Mile Post

TRANSCOLORADO GAS TRANSMISSION PROJECT

R18W R17W R16W R15W R14W R13W R12W R11W R10W R9W

T43N T42N T41N T40N T39N T38N T37N T36N T35N

San Miguel Co. / Dolores Co.

Dolores Co. / Montezuma Co.

Matching / See Sheet 2 of 3

BLM MONTROSE DISTRICT

BLM San Juan Resource Area

San Juan National Forest

Mancos Valley East Variation

Mancos Valley Central Variation

Animas Valley Variation

12. Dolores Compressor Station Alternate Site #2 (TransColorado)

13. Dolores Compressor Station TransColorado (TransColorado)

STONER

DOLORES

Dolores River

CORTEZ

MANCOS

MANCOS HILL

HESPERUS

DURANGO

Mesa Verde

Montezuma Co. / La Plata Co.

CORTEZ

MANCOS

MANCOS HILL

HESPERUS

DURANGO

Animas Valley Variation

Mesa Verde National Park

Mesa Verde National Park

BLM San Juan Resource Area

BLM San Juan Resource Area

Ute Mountain Indian Res.

Ute Mtn. Ute Indian Res.

So. Ute Indian Res.

Southern Ute Indian Res.

Animas River

Montezuma Co.

La Plata Co.

BLM MONTROSE DISTRICT

Montezuma Co.

La Plata Co.

BLM MONTROSE DISTRICT

COLORADO

NEW MEXICO

BLM ALBUQUERQUE DISTRICT

San Juan Co.

BLM ALBUQUERQUE DISTRICT

BLM Farmington Resource Area

Navajo Indian Reservation

San Juan Valley Variation

BLM Farmington Resource Area

SHIPROCK

Navajo Indian Reservation

FARMINGTON

BLOOMFIELD

San Juan River

Animas River

San Juan River

14. Blanco Meter Station

Blanco Gas Processing Plant

20V

30V

40V

50V

60V

70V

80V

90V

10V

240A

250A

260P

270P

280P

290P

300P

260A

270A

280A

T35N

T34N

T33N

T32N

T31N

T30N

T29N

R18W

R17W

R16W

R15W

R14W

R13W

R12W

R11W

R10W

R9W

U.S. Department of the Interior
Bureau of Land Management
Montrose District Office
2465 South Townsend Avenue
Montrose, Colorado 81401

Official Business
Penalty For Private Use $300

Bound Printed Matter

Conrad, Bruce
Bureau of Land Management
764 Horizon Drive
Grand Junction, CO 81501

Public Lands: USA (Use, Share, Appreciate)